THE WELL-SPRING OF SCIENCES.

Which teacheth the perfect worke and practise of Arithmeticke, *both in whole Numbers, and Fractions: set forth*

By

HUMFREY BAKER

Londoner.

Now newly perused, augmented, and amended in all the three parts:

Whereunto is also added certaine Tables of the agreemēt of the measures and waights, of diuers places in Europe, the one with the other: as by the Table appeareth.

AT LONDON,
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TO THE RIGHT

Worſhipfull the Gouernours, Aſſiſtants, and the reſt of the Companie of Marchants Adventurers : *Humfrey Baker* Londoner, *wiſheth health with continuall increaſe of commodity by their worthy trauaile.*

IF THE KNOWledge of Arithmeticke (Right Worſhipfull) were of ſo ſmall profite in the life of man, or ſo litle vſed in our worldly Affaires, that it might be well left, or but ſeldome frequented, it were well done by the profeſſors therof to pen very long and Eloquent Orations, in ſetting forth the commendation of the ſame. But ſince experience

hath taught to bee true the old Prouerbe: *That where good wine is to sell, there needs no garland be hanged out.* Me thinketh they do great iniurie to Arithmetick, that seke to heare the cõmodities therof set forth in a short Epistle, & surely they ouercharge me in laying such a burthen on my back as were too importable for the greatest Orator. For the skil hereof is wel known, immediately to haue flowed from the wisedome of God, into the heart of man, whome he hath created the chiefe Image and instrumẽt of his praise & glory, reuealing himselfe vnto him so far as he judged cõuenient, whome notwithstanding he could not conceiue to remaine in the most secret mistery of Trinity in vnitie, were it not by the benefit of most diuine skill in nũbers, which skill as also the most full & effectuall knowledge of all other thinges vnspeakeable, GOD vsed in his wonderfull Creation of all the worlde out of nothing, which he accomplished within

In the compasse of certaine nūber of dayes, expressing moreouer, what he made in euery day & of certaine his creatures how many he made, as appereth in the book of Genesis writtē by speciall Reuelation of the holy Ghost, wherein the diuine Maiestie of God could not be known vnto vs without the knowledge of numbers, nor *Moyses* haue vnderstoode what himselfe had written. And *Salomon* the wisest man that euer was, cōside-ring the very depth of all things within his mind, to whome God had giuen a greater gift of wisedome, thā to any man either before or since, doubted not to breake forth in these words, saying: Thou O Lord hast disposed al things in measure, nūber, & waight, for thus it pleased him to iudge: who in another place testifieth how that he hath searched deeper into the causes and knowledge of all things, thā any other mā in the world.

These Testimonies (right worship-full) do manifestly teach vs, what we

ought to thinke of the cause, & originall of Arithmeticke, and partly also how necessary it is in the life of man, that vnlesse by nature we haue some feeling and vnderstanding therein, we are no better then Beasts, and in this respect worse, for that we retain not that whereunto we are as specially borne, as naturally they doe, some to running, some to smelling, some to hearing, some to flying, and some to swimming. Take away Arithmeticke, wherein differeth the Sheapheard from the Sheepe, or the Horse-keeper from the Asse? Surely but onely in shape and figure, which as the learned affirme, is a very slender cause of difference. Wherfore not without iust cause haue the auncient Fathers and Philosophers singularly extolled the knowledge of Arithmeticke, diligently trayning vp their youth therin, as in a Science most necessary of it self, cōsidering the deepe deuises, the profound practises, and cunning conclusions therein contained:

ned : and alſo that it is the Kay and entrance into all other Arts and lear- ning : as well approoued the Noble Philoſopher *Pythagoras*, who cauſed this inſcription to be written vppon his Schoole doore (where he taught Philoſophie) in great Letters: *Nemo Arithmetica ignarus hic ingrediatur:* Let none enter here that is ignorant in Arithmeticke : which ſaying, as it is proper & peculiar vnto all ſorts of men in the beginning and entrāce into all liberall knowledge and Fa- culties to be enſued and embraced, ſo ſurely aboue all other, it is (next after the word of God) moſt fit and neceſſary, that it ſhould bee written vppon your Schoole doores (Right Worſhipfull) whoſe Trade and tra- uaile is imployed in the Noble Traf- fique of Marchandize, wherein you haue need of continuall recourſe vn- to this excellent Art. The daylie exerciſe whereof, hath ſo ſharpened your Iudgements, and ripened your vnderſtandings, that moſt of you are

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become singular therein, both to deale that way your selues, and to judge of other mens doings. And heerein I am sure you are good witnesses with me how foolish & vaine is their opinion, which beside your most commendable Affaires, suppose and affirme that Arithmeticke is of small vse vnto any other men, seeing that the Lawes of sundrye Realmes well instituted and guyded, haue deseruedly accoũted for Fooles and vnfit members,(to rule or deale in a common wealth,) all such as wanted the skill of natural Arithmeticke, depriued them both of Landes and liuing, which as it tendeth vnto no small praise and credit of Arithmetick, so am I constrained for breuitie sake, in fewe words to ouerpasse both that and others which might bee sayde in commendation thereof. Shortly admonishing your Worships, that wheras in times past as is well knowne, I had trauailed in a Booke in English of that Facultie,

dedicated vnto you: being now enforced to runne ouer the ſame, both amending and augmenting it with ſundry Additions: I am ſo bolde agayne to attempt your Worſhippes with the acceptation thereof, hoping that as in fore-time yee haue taken it ſuch as it was, yee will now alſo daygne to receiue it, beeing in better caſe (I hope) than euer it was, a token of my good will, how be it a ſimple thinge, wherein you may weygh the heart and not the guift, proceeding from ſuch a Fountaine, that if better skill & knowledge had been matched to my good meaning, it ſhould haue beene doone otherwiſe, to the better contentation of your Worthyneſſe. And therefore in the meane ſeaſō vntill it pleaſe God to fourniſh mee in ſuch ſort, I reſt in dayly prayer vnto him, to maintaine your Fellowſhip in happy eſtate, & to bleſſe your purpoſes with lucky ſucceſſe, to guide your voyages with

wiſhed increaſe, and to ſeaſon your doings with all kind of vertue, and to preſerue your liues with deſired health to his will and pleaſure.

At London the 4. day

1637

of Ianuary. 1584.

0053

1637

The

THE PROLOGVE to the gentle Reader.

HAVING SOMEtime now twelue yeares (Gentle Reader) published in print one English booke of Arithmeticke containing (as I suppose) sundry necessarie and profitable documents for such as are willing to attaine any knowledge therein, I haue beene often since that time, and of very late also, requested by sundry of my friends, to peruse the same worke, and as I should now iudge it expedient, to adde something more thereunto, and to amplifie the same. Which earnest & frendly suite of theirs, for certaine iust causes seeming needfull

full vnto me, surely I could in no wise deny. For when I perceiued the importunitie of certaine strangers, not borne within this land, at this present and of late daies, so farre proceeding, that they aduanced and extolled themselues in open talke and writings, that they had attained such knowledge and perfection in Arithmeticke, as no English man the like : Truely, me thought that the same report not onely tended to the dispraise of our countrimen in generall; But toucked especially some others and me, that had trauailed and written publikely in the same Faculty. For vnto this same effect they haue of late painted the corners and posts in euery place within this Citie with their peeuish Bills, making promise, and bearing men in hand that they could teach the summe of that Science in briefe Methode and compendious rules, such as before their arriuall, haue not bin taught within this Realme. Whose sayings to be false, and writings vntrue, if I were thereto required by men of authoritie, I am well able to

proone, and that is more (be it spoken without enuie, or thirst of praise) euen within this same booke, if it may please thee to make triall, are generall precepts and Rules to be found, such, as they can bring forth neither briefer nor better. But this is no rare thing, since in other matters of great importance, their attempts are too too perilous, and their deedes outragious, well deseruing restraint and banishment, against one of whome, verily not of mine owne accord, but constrainedly, I haue been enforced to sharpē my pen, for that he, as I heare say, continueth in dispraise of our Nation, saying, that we are vnskilfull in those rules that he teacheth, and himselfe excellent in the knowledge of Arithmeticke, wherin, if true tryall might be indifferent iudge, I doubt not but he would bee found to haue least sikll of a great many: of whome perhaps, if I should write vpō report of others, I could say somewhat more which would (if it were true, and he knowen) redound vnto his vtter discredite, which for this

cause

cause I omit to doe, least the crime of arrogancy might be thought to rest within me, which I obiect against him, howbeit, thus much I dare affirme, that there are diuers in this honourable Citie, who although they aduance and extoll not themselues (so malapertly) as these sort of men are accustomed to doe in all that they professe, yet doe far surpasse them, aswell in the knowledge of numbers, as in all other kind of learning & skilfulnesse. Another cause also there is of this present edition, as it seemeth to me very iust and necessary, for when a certaine welwiller of mine purposing to imploy some time in bettering his knowledge in Arithmeticke through the reading of this present booke, did certify me, that he in perusing the same had espied so many errours committed in the printing, that he could gather no truth thereby. I was not a little mooued thereat, since that by disordering thereof, neyther the worke retained his true meaning, neither could the learner attaine his desired knowledge: and surely

no

no maruaile, for as I am credibly informed, ſince it paſſed out of my hands, it hath been often times printed without the view of a ſkilfull corrector, vnto the great diſcredit of the Authour. Theſe and ſuch like conſiderations, vrging me forward and not forgetting the fruite (louing Reader) that may grow vnto thee hereby: I haue taken in hand both to amend and augment the ſame, ſeaſoning (as it were afreſh) all three parts of the worke, with diuers queſtions and examples, verie neceſſarie and profitable, hauing alſo for thy commoditie added vnto the end of this booke diuers & ſundry tables of the agreement of meaſures and waights of ſundry places reduced to an equallity, the one to the other. Vnto thee therefore my requeſt is thankefully to accept the ſame, and in good part, wiſhing well to him that trauaileth for thy benefit, not diſdaining it in reſpect of groſſeneſſe of the ſtile, or rudeneſſe of vtterance, ſince that this Science requireth not eloquence of writing, but plaineneſſe of teaching, and

truth in working of diuers conclusions by numbers onely, desiring thee, if thou be willing to profite heereby: first friendly to amend the faults that haue escaped in the printing of the same, and then to begin at the entrance of the booke, and so orderly proceeding forward to the end, not turning vnto the middest or last part thereof, vntill thou perceiuest well that which went before. And so doing thou shalt not onely attaine to the perfect knowledge of the whole effect: But be able also by thine owne labour and industry, to vnderstand all other boookes of Arithmeticke whatsoeuer: and thus I bidde thee farewell hartily.

The Definition of Number.

NVmber, is as much to say, as a multitude composed of many vnities, as two is composed of two vnities, three is cōposed of three vnities, foure of foure vnities, fiue of fiue vnities, ten of ten, fourteene of fourteene, fifteene of fifteene, twentie of twenty vnities, &c.

And therefore an vnity is no number, but the beginning and originall of number, as if you doe multiply or diuide an vnitie by it selfe, it is resolued into it selfe without any increase: but it is in number otherwise, for there can bee no number, how

Willm Bird his Book 1749

great soeuer it bee, but that it may continually be increased by adding euermore one vnitie vnto the same.

Chap. 1.

Numeration.

Numeration is the Art whereby to expresse and declare the value of any Summe proposed: and is of two kinds, the one gathereth the value of a summe proposed, and the other expresseth any summe conceiued by due figures and places, for the value is one thing, and the figures are another thing: and that commeth partly by the diuersity of figures, but chiefly of the places wherein they be orderly set. And therefore you must first marke, that there are but ten figures or characters which are used in Arithmeticke, whereof nine of them are called significant figures, and the tenth is called a cipher, which is

made

made like an o, and of it selfe signifieth nothing, but if it be ioyned with any of the other figures, it encreaseth their value, and these be they.

1	2	3	4	5	6
one,	two,	thrée,	foure,	fiue,	sixe,
7	8	9	0.		
seuen,	eight,	nine,	a Cipher.		

Also you shall understand that euery one of these figures hath two values: One is alway certaine and hath his signification of his owne forme, and the other is uncertaine which he taketh of his place.

A place is called a seat or rowme that a figure standeth in, & how many figures soeuer are written in one Sum, so many places hath the whole value thereof. And that is called the first place (which is next toward the right hand) of any summe, and so reckoning by order towards the left hand, so that that place is last, which is next the left hand. And contrariwise, when you expresse the value of the figures in any summe, you must *A place.*

begin at the left hand, and so reckon towards the right hand.

Euery of these nine figures, (which are called signifying figures) hath his owne simple value when hee is found alone, or in the first place of any summe. In the second place toward the left hand, he betokeneth his owne value ten times. As 70. is seuen times ten, that is to say, seuenty: 80, is 8 times ten, that is to say, eighty. In the third place euery figure betokeneth his owne value a Hundreth times. As 700, in that third place betokeneth a hundreth times 7, that is to say, seuen hundred. In yͤ fourth place euery figure betokenth his owne value a thousand times. As 7000, is seuen thousand, & 8000, is eight thousand. These foure first places must be had perfectly in mind, yea & that by hart as they say, for by yͤ knowledge of them you may expresse all kind of numbers how great soeuer they be.

In the fift place, euery figure betokeneth his own value 10 thousand times.

times. As 70000, is ten times seuen thousand, that is to say, seuẽty thousand. In the sixt place, euery figure standeth for his owne value, a hundreth M. times. As 700000 is seuen hundreth thousand. The seuenth place, M, M, times, or a million. As 7000000, is seuen M, M, or seuen Millions. And the eight place ten M, M, times, or ten milliõs: so that euery place toward ẏ left hand, exceedeth the former ten times. But now for the easie reading, & ready expressing orderly of any summe proposed, you shall practise this manner following. And for exãple. I propone this number 765432658, in the which are ix. places. In the first place is 8, and betokeneth but eight, that is to say, once his owne value: in the second place is 5, and betokeneth ten times fiue, that is fifty: in the third place is 6. and betokeneth an hundreth times sixe, that is vi. C. In the fourth place is 2, and that is two M. And 3, in the v. place, is ten M times 3, that is xxx

M. So 4 in the first place is C. thousand times 4, that is foure C, M. Then 5, in the seuenth place is a M, M, times 5, that is fiue M, M. or rather fiue Millions. And 6, in the eight place, is six times ten Millions, that is, lx. Millions. And last of all vii. in the ix. place, is vii. C. Millions. Now followeth the practise. First put a pricke ouer the fourth figure, & so ouer the seuenth, and likewise ouer the tenth. And also ouer the 13, 16. or 19, if you haue so many, & so still leauing two figures betwéene euery two pricks, and these rowmes from one pricke to another, are called Ternaries, thē you must pronounce euery thrée figures from one prick to another, as though they were writtē alone from the rest. And at the end of their value, add so may times a thousand, as your number hath prickes: (that is to say, if there be but 1 pricke it is but 1 M: if 2 pricks, 1 M, M, or else a million: if 3 pricks, one M, M, M, or a M. miliōs. And so consequētly

Ternaries.

ly of all other figures following.) Then come likewise to the next 3 figures, & sound them as if they were a-part from the rest, and adde to their value so many times Thousands, as there are pricks betwéene them and the first place of your whole number. And so doe by the next 3 figures following, and all the rest likewise: as in example 451234678567. The first pricke is over 8, in the fourth place, which is the place of a M. the second pricke is over 4, in the seventh place, which is the place of a M, M, or one million: the third pricke is over the tenth place, which is the place of a M, M, M, or of a M, millions as in the former example. Then for the expressing of this number by the value of every figure, according to the place wherein they stand, you shal first beginne at the last pricke over 1, and take it and the other two figures 5, and 4, which are behind the sayd 1, towards your left hand, and value them alone, & they are foure C li. M

M, M, or else CCCC li, M, miliōs. Then take the other three figures from 1 to the next prick toward your right hand, and value them as if they were apart from the other, and they are 234 which do siguifie CCxxxiiii. millions, or 234 M M. Thē come to the third pricke over 8, and take the other two figures behind it, and reckon them likewise as if they were alone, and they are six Clxxviii. M. And last of al, come to the other three figures which remaine, that is 567: and they are fiue Clxvii. Thus the whole sum of these figures, is foure Cli. M, two Cxxxiiii. Millions, six Clxxviii. M, fiue Clxvii, as before.

Three kinds of number.

Note also that whole number is diuided into three kinds, that is to say, diget number, article number, and mixt or compound number. The diget number, is all manner of numbers under ten, which are these nine figures, 1, 2, 3, 4 5, 6, 7, 8, 9, of the which I haue spoken before.

Diget.

Article.

The Article number is any kind which hath in

in the first place a Cipher, as this o, and they may euer be diuided iust by 10, without any remain, as these, 10 20, 30, 40, 50, 100, & all other such like. The mixt or compound number containeth diuers and many articles, or at the least one article, and a diget, as 11, 12, 16, 19, 22, 38, 108, 1007, and so forth. And as any article number may bee made a compound, by putting thereto a diget, euen so likewise euery compound number, may be made an Article number, by adding therevnto 10.

Mixt or cōpound.

¶ And

¶ And here followeth a briefe rehersall of the order & Denominators of the places. And this shal be sufficent for Numeration.

The order of the places.		The Denominators of the places.
Tenth.	4	M. of Millions.
Ninth.	3	C. of Millions.
Eight.	2	X. of Millions.
Seventh.	1	Millions.
Sixt.	0	C. of Thousands.
Fifth.	1	X. Thousands.
Fourth.	8	Thousands.
Third place.	3	Hundreths.
Second place.	4	Tenths.
First place.	5	Unities.

4

Chap. 2.

Additiõ in whole number.

ADdition is as much as to bring together two sums or more into one, as if there were due to any man 223 li by some one body: & 334 li. by another, & 431 by another: & you would know how many pounds is due to yͤ same man in all: these three sums shall you set downe orderly the one vnder the other, writing the greatest sum highest, & the next to the greatest vnder it, and the least Sum vnder the last, in such sort, that the first figure of the one sum towards your right hand be directly vnder the first figure of the other, and the second vnder the second, & so forth in order. When you haue thus done, draw vnder them a straight line, and then will they stand thus.

431
334
223

Now beginne alwayes at the first places toward your right hand,

hand, and put together the thrée firſt figures of yͤ firſt places of theſe thrée ſummes, and looke what commeth of them, & write that under them beneath the line, as in ſaying 3, 4, and 1, being put together doe make 8: write 8 under thrée, as here you ſée.

431
334
223
8

And then goe to the ſecond places of figures and do likewiſe: as in ſaying 2, 3, and 3, make 8, write 8 under 2, as here you ſée.

431
334
223
88

And doe likewiſe with the figures that be in the third place, in ſaying 2, 3, and 4, are 9, put nine under them, and ſo will your whole ſumme appeare thus: whereby you may perceaue that thoſe Thrée Summes being added together, doe make 988 &c. And this is the Art of Addition according to his ſimplicity, when the ſum of any place doth not excéed a diget number. But in caſe the

431
334
223
988

the summe of any one place cānot be expressed by one figure, but by two, you shall put the first of those figures vnder the line, and keepe the other in your mind, for to adde it vnto ẏ first figure of ẏ next place. And if ẏ same next place cannot be aualued but by two figures, you must in like māner put the first of those figures vnder ẏ line, and reserue the second for the other place next after, and thus must you do from one place to another, vntill you haue come to the last place, where, if it happē you do find that the sum be of thwo figures, you must set them both down because it is the end of that worke, as in this example.

734682456
450932345
13467891
4671123
1203754815

Where the first figures are 3, 1, 5, 6, which added together maketh 15, &

for that, that 15 is of two figures, I doe put the first figure 5 vnder the line, & keepe the second figure (which is 1) in my mind, the which I must adde with the next figures of the second place, that is to say, with 2, 9, 4, & 5 : the which together make 21. I write 1 vnder the line for ẏ second figure of that addition, that is to say, after 5 : and I keep 2, to be added vnto the third place, the which with the other figures, 1, 8, 3, and 4, do make 18 : therefore I put 8 next after 1, in the third place vnder the line, & keepe 1 to be added vnto the figures of the fourth place, which is with 2, 7, 2, 2, the which with the 1 that I keepe, do make 14 : I set down 4 for the fourth figure (vnder the line) that is to say, behind 8 : and I keepe 1 to be added vnto the figures of the fift place, the which is 7, 6, 3, and 8, with ẏ 1 that I keepe, maketh 25 : I put 5 in the fift place, vnder the line next after 4 : and I keepe 2 in my mind, to be added with the figures of the sixt place,

that

that is with 6, 4, 9, and 6, and that 2 which I kéepe, maketh 27: I write down 7 under the line in ÿ first place, and I kéepe 2, which I adde with the figures in the seuenth place, and they make 13: I put downe 3 under the line in the seuenth place, and adde 1 unto the figures in the eight place, & they are 10: I do put 0 under ÿ line in the eight place, and then I adde 1 unto the ninth place, that is to say, with 4 and 7, and they make 12: the which 12 I write at length under the line because it is the end of this Addition, and thus is to be done of all such like. And for the easier understanding of that which we haue spoken of Addition, you may examine these two other examples following, in the which the first hath these numbers, 3570, 2763, 579, & 28: which being added together, doe make this number 6940, and in the second example, doth result this nũber 51683 by adding together of these numbers 47630, 3756, 272, 25, as here under written.

Written.

The numbers to be added.	3570	47630
	2763	3756
	579	272
The line put betweene.	28	25
The summe of this Addition.	6940	51683

Addition of li. s. d.

But if I haue any summes which are composed of diuers kinds of denominations, as 25 li. 17 s. d. and 14 li. 13 s. 8 d. and 16 li. 19 s. 7 d. to be added together. I must first set downe all the said Summes the one vnder the other, as here you see: placing the title of pounds right vnder the pounds, ẏ shillings vnder the shillings, and the penies vnder ẏ penies, keeping likewise ẏ

li.	s.	d.
25.	17.	4.
14.	13.	8.
16.	19.	7.
57.	1[illegible]	7

due

due order of their places, in each denomination. And then I beginne at the least denomination which are penies: And I say thus: 4 and 8 make 12, and 7 make 19 d: that is 1 s. & 7 d. I set downe 7 under the line against the place of penies, & I doe keepe in my mind 1 s. to be added unto the place of shillings: This done, I proceed to the sayd place of shillings saying, 1 s. that I keepe & 7 s. are 8, and 3 are 11, and 9 doe make 20: I put 0 under the line against 9, and do keepe 2 in my mind: Comming then unto the tens of shillings, I say 2 that I keepe, and 1 make 3, and 1 make 4, and 1 make 5: which are 5 tens of shillings, that is to say, 2 li. and 1 ten over, the which 1 I put behind the 0 towards my left hand under the tens of shillings, and I doe keepe two li. in my mind, then I come to the place of pounds and say 2 li. that I keepe, and 5 are 7, and 4 are 11, & 6 do make 17 li: I do set 7 li. under the line against 6, and do keepe 1 in my

mind, then comming unto the ten of pounds, I say 1 that I keepe and 2 are 3, and 1 are 4, & 1 doe make 5: the which I write downe under the line behind the 7: And so is this Addition ended: And then the said three summes being added together doe amount to 57 li. 10 s. 7 d. And thus is to be done of all other summes, of any other denominations.

Other examples.

225. 12. 6.	5678. 13. 9.
47. 3. 9.	608. 00. 10.
38. 18. 7.	400. 17. 11.
5. 00. 8.	56. 18. 4.
316. 15. 6.	9. 12. 7.
	6754. 03. 09

1622

64

Chap. 3.

Of Substraction in whole Number.

SUbstraction teacheth how you shall substract one lesser number frō a greater, and sheweth what there doth remain after that you shal haue substracted the same, I speake not of the substracting of one equall nūber, from another equall unto it, for the facility thereof requireth no rule.

In Substraction are found three numbers, the one is the number frō the which the substraction is made. The second is the nūber that is to be substracted, & the third is the number which remaineth after ẏ substraction is ended. As whē I would substract 25 from 40: The said 40 is the number from the which the substraction is made, & 25 is the number to be substracted, & 15 is the number which

remaineth after you haue ended the substraction: here followeth the practise. You shall put the lesser number vnder the greater in such sort that euerie figure of the one number, may answere vnto euerie figure of the other orderly according to their places, and then draw a right line vnder those two numbers as you did in addition. Then must you beginne at the right hand, and take the first figure of the vndermost number and substract that from the first figure of the vppermost number ouer it, and that which remaineth you must set vnderneath the line right vnder the figure which you haue substracted: then afterward take likewise the second figure of the nethermost number, and abate that also from the second figure of the higher number: the third from the third, and so forth of all the rest till you come to the end, putting alwayes the remaine of euery figure vnder the line in his due order and place, as by example I will substract

2345,

2345, from 9876, after that I haue set them down according to the manner aforesaid. Then beginning	9876 2345 7531

at the first place next to my right hand. I take first 5 from 6, and there resteth 1: the which 1 I set vnder the line right against 5. Secondly I substract 4, from 7, and there resteth 3: the said 3 I set in the second place vnder the line next after 1. Thirdly I substract 3 from 8, & there resteth 5, the which 5 I put vnder the line in the third place next after 3. Finally I doe substract 2, from 9, and there resteth 7; the which 7 I put vnder the line in the fourth and last place next after 5, and thus is this substraction ended, in the which there remaineth 7531.

But when two figures of one likenes do chance to méet, so that the one must bee substracted from the other, as if I should substract 7 frõ 7 there would remaine nothing: then must I set a Cipher 0, vnder the line. But

when the figure which is to be substracted doth exceed ẏ figure which is ouer him, so that it cannot be taken out of the same figure. Thē must you substract the vndermost figure from 10. and that which doth remain, you shal adde vnto the same figure which is vppermost. And the summe which resulteth of them both, you shall set vnder the line. But whensoeuer you doe borrow any such 10 of the ouernumber, you must add 1 to the next nethermost figure following which is yet to be substracted. And there is nothing else to be done in substractiō. Example, I will substract 93576 from 4037479: after ẏ I haue placed my two numbers as I ought to do, I doe first substract 6, from 9, & there resteth 3, the I put the 3 vnder the line right vnder the 6. And secondly I substract 7 from 7, & there resteth nothing: I do therefore put a cipher 0 vnder the line right against 7 in the

4037479.
93576.
3943903.

second

ſecond place. Then I come to the third place where I find 5, which I cannot ſubſtract from the figure ouer him, which is but 4, therefore I doe ſubſtract it frõ 10: as before I taught and there reſteth 5, the which I doe adde with the 4, which is ouer him, & that maketh 9: I put 9 in the third place vnder the line for the third figure. Fouthly, for the 10 which I borrowed I adde 1 vnto the next figure which is to bee ſubſtracted, which is 3, and they make 4: the ſayd 4 I doe ſubſtract from the ouer figure 7, and there reſteth 3, I put 3 vnder the line for the fourth figure. And thẽ I come to ẏ fift place where I do find 9, which I cãnot ſubſtract frõ the figure ouer him, which is but 3, but I doe ſubſtract 9 from 10, and there reſteth 1, the which figure 1 I doe adde with 3, and they make 4: I put 4 vnder the line for the fift figure And here is to be noted that if it were not for that I did at ẏ laſt borrow 10 the ſubſtraction ſhould haue been en-

ded. But for because that I must (for every such 10 that I borrow) alwais adde 1 unto the next lower figure following, I must therefore procede unto the substraction. And for because that there is no other figure following in the lower number, it shall suffice to have kept the unity, & to substract it from the next over figure, but I find there 0, and therfore I cannot substract 1 from 0, therefore I substract it from 10, and there resteth 9: which I doe put under the line in the sixt place: finally for the ten which I borrowed, I kepe 1 in mind: The which I do abate from 4, and there remaineth 3, the which 3 I doe put under the line in ẏ seventh place after 9, and the operation is thus ended.

Another example.

57608402 6
48567543 7
9040858 9

But if there were many numbers to be substracted from one number alone, then must you first adde those

numbers

numbers together according to the inſtruction of the Chapter going before, & afterward to make your ſubſtraction as aboue is ſaid. As if I would ſubſtract theſe thrée ſummes 123, 234, 456, from 98925: firſt I do adde the thrée ſummes into one, & they are 813. The which I doe ſubſtract from 98925, and there reſteth 98112.

But if the ſummes be compoſed of diuers kinds of denominations, then you muſt begin at the leaſt denomination next toward your right hand, and ſo ſubſtract euery denomination frõ his like if it may be ſubſtracted, if it cannot be ſubſtracted, thẽ you muſt borrow 1 of the next denomination toward your left hand and reduce the ſame into the like denomination of that figure which is to be ſubſtracted, then ſhall you ſubſtract your firſt or leaſt denomination, frõ the ſaid ſum ſo borrowed, and that figure or number that ſhall remain, you muſt adde with the vppermoſt number of the

leaſt

least denomination, and set the aggregate vnder the line right against his like. Then the 1 which you did borrow must be added with ye next figure of the next denomination, that is to be substracted, and so to procede with the whole summe that is to be substracted. Example.

I would substract 15 li. 17 s. 11 d. from 28 li. 13 s. 9 d. I doe first put down the great sum, and vnder that the lesser with a line vnder them, as here you see, and then I doe beginne at ye least denomination which are penies, where I say 11 penies from 9 pennies, I cannot. And therfore I must borrow 1 s. of the next denomination that is of the 13 s. the which 1 s. is 12 pennies: Then I substract 11 penies from 12 penies, and there remaineth 1 peny, the which 1 peny I doe adde with 9 penies, and they make 10 penies; the said 10 I set vnder the line & do keepe the 1 s. in my mind that I borrowed,

li.	s.	d.
28.	13.	9.
15.	17.	11
12.	15.	10.

borrowed; then come I to the second denomination of shillings, where I doe find 17 s. then I say 1 s. that I borrowed and 17 do make 18 s: the said 18 s. out of 13 s cannot be: therfore I do borrow 1 li. of the next denomination, that is to say, out of the 28 li and the said 1 li. are 20 s. then I substract 18 s. from 20 s. and there remaineth 2 s. with the which I doe adde the 13 s. and they do make 15 s: the same 15 s. I set vnder the line, and I do kéepe 1 li. to be added to the lower place of pounds: then I say 1 li. that I kéepe, and 5 are 6: I substract 6 li, from 8 li. & there remaine 2. I set ý said 2 vnder ý line against 5: and last of all, I come to ý tens of pounds where I do find 1, then I do substract that 1 from 2, and there remaineth 1, which I set vnder the line, and so I find there remaineth 12 li. 15 s. 10 d. and so is to be done of all other like.

Of Multiplication.

IN Multiplication there are iij. numbers to be noted, that is to say, the number which is to be multiplyed, the which we will call the Multiplicand: the second is the number by the which we do multiply, which we will name ẏ multiplyer, or multiplicator: and the third number is that which commeth of the multiplication of the one by the other, ẇ is called the Product. As when I would know how much amounteth 10, multiplied by 9, that is to say, how much are 10 times nine. I find that they are worth 90, then 10 is the multiplicand, and 9 is the multiplyer, and 90 is called the product. So ẏ to multiply, is none other thing, but to find a nūber which containeth the multiplicand so many times, as the multiplyer containeth vnities: As 10, multiplyed by 9, doe make

make 90 as before is said. And 90 cõtaineth 10 so many times as 9 cõtaineth vnities, that is to say 9 times.

In Multiplication, it forceth not much which of the two numbers be the multiplycand, nor which be the multiplyer. For 10 multiplyed by 9, maketh as many as 9 multiplyed by 10, yet neuerthelesse it shall be more commodious that the lesser number be alwaies the multiplier.

And for that, that the multiplication of figures the one by ẏ other, is ẏ chiefe & necessariest kind whereby to know how to worke in the multiplication of cõpound numbers, and that euery man hath not the same at the fingers end, I will therfore giue you here certaine easie waies of multiplication of diget numbers. When you would multiply two simple figures, or digets ẏ one by the other, substract each of those diget numbers from 10. Then multiply the two remains the one by the other, and if the summe do exceed 10, write onely the first figure

and

and keepe the other to be added to the next operation, which is thus as followeth. Adde your 2 simple figures together: & of ẏ which resulteth of the addition, take only the 1 figure, vnto the which you must adde the vnity ẏ you did keep before. And ẏ shalbe the second figure of the sum which you do seeke. Exam. I would multiply 7, by 6, I take 7 frō 10 & there resteth 3: likewise I substract 6 from 10, and there resteth 4, thē I say thus, 3 times 4, make 12: I write 2 for my first figure, & keepe 1 in mind: then I adde 6 with 7, & they are 13: of the which I cast away the second figure toward my left hand which is 1: and I take onely the first figure 3 which is toward my right hand, vnto the which I add the vnity which I kept, & they make 4, which I write in the second place after 2, & thus I find 42 which is the valure of 7, multiplyed by 6.

Otherwise, and all commeth to one effect: let down your two diget numbers the one right ouer the other, and right

right against every of them towards the right hand write his owne difference from 10: Then multiply ẏ two differences together, the figure which commeth thereof, shall you set downe vnder both ẏ differences if it be a diget number, that is to say, any nũber vnder 10. But if there be 2 figures, set downe but the first, and keepe the other in your mind, afterwards substract (frõ one of the two diget numbers) that were first set downe, ẏ difference of ẏ other diget number, that is to say crosswise. And vnto the remaine adde ẏ figure which you kept before: & that shalbe the second number, & thus shal you haue your multiplication. Example of ẏ same figures, that is to say, of 7 multiplied by 6, the difference of 7 from 10, is 3: and the difference of 6 from 10, is 4: I set them downe crossways as you see: And then I say thrée times foure are 12: I set downe

7	3
6	4
4	2

downe 2, and keepe 1 in my mind, then I subtract 4 from 7, or else the from 6. it forceth not, from which of them, y there resteth alwaies 3: unto the which I adde the unitie which I kept in my mind, and they are 4, which shal be the second figure of the multiplication. And thus I find that 7, multiplied by 6, maketh 42: as in the other operation. This practise hath no place where the 2 digit numbers (doe not exceed 10,) by adding them together, and then is multiplication easy inough without any rule.

Another way to know the multiplication of simple numbers, is by this table following: the use whereof is thus.

First you shall understand that the numbers from 1, and so descending downe-wards to 9, which are set in the left part or hanging margine of this table, doe betoken the multipliers of all simple numbers. And the elements or figures being put highest, in everie square columne drawing

toward your right hand right against euery of the multiplyers, doe signifie the multiplicands, which doe appertaine vnto the multipliers of ye hanging margine. And ye lower or inferior numbers in euery square rowme, do betoken the product of that multiplication, which is made in multiplying the upper number ouer it, with the figure in the hanging margine, answering directly vnto the sayd square : as by example.

The Table of Multiplication by all the Diget Numbers.

1	1 1	2 2	3 3	4 4	5 5	6 6	7 7	8 8	9 9
2	2 4	3 6	4 8	5 10	6 12	7 14	8 16	9 18	
3	3 9	4 12	5 15	6 18	7 21	8 24	9 27		
4	4 16	5 20	6 24	7 28	8 32	9 36			
5	5 25	6 30	7 35	8 40	9 45				
6	6 36	7 42	8 48	9 54					
7	7 49	8 56	9 63						
8	8 64	9 72							
9	9 81								

First because 1, doth not multiply, I haue set in the vpper margin the figures from 1, to 9: both in the higher and also in ẏ inferior rowes, for 1, in the hanging margine, multiplyed by 1, the vpper number in the first square bringeth but 1. So likewise 2, being the higher number in ẏ second square of the vpper margine, multiplyed by 1 in ẏ hanging margin, bringeth 2 for the lower number in ẏ second square of the vpper margine: For 1 times 1 maketh but 1: and 1 times 2 maketh 2. Then 1 times 3 maketh 3: and 1 times 4, maketh 4: And so continuing toward the right hand vntill I come to ẏ figure of 9, which is 1 times 9, maketh 9. Thē afterwards I multiply 2 of the hanging margine by 2, which is the vpper number of the square next toward the right hand, & that maketh 4 which is ẏ product of 2 multiplyed by 2, that 4 I set vnder ẏ 2, for 2 times 2 are 4: and 2 times 3 maketh 6: then 2 times 4 maketh 8, and 2 times 5 maketh 10, and so

continuing unto 2 times 9, which maketh 18. The like is to be done with the third row, and so likewise of all the residue.

Example, I would know what is the product of 9, multiplied by 8. I seek in the hanging margine the multiplier 8, and amongst the squares directly against 8, drawing toward the right hand, I seeke the multiplicand 9, in the higher row, and I find the product right under 9 to be 72: Then 72, is the number which commeth of the multiplication of 9 by 8, And so is to be understanded of all the rest of the table. Which table must be (of all men) learned by heart, or as they say without booke: which being learned you shall the better attaine to the rest of multiplication.

To come now unto the practise of multiplication, whẽ you would multiply two numbers, the one by the other, you must set them down after ye same maner as you did in Addition, and in substraction; that is to say, the

first

first figure of the mutiplier vnder the first figure of the multiplicand, the second vnder the second, and ỹ third vnder the third, if there be so many, & then drawe a right line vnder them, as in the other operations going before. After this you shall multiply all the figures of the multiplicand by the multiplier, and set downe the figures (comming of any such multiplication) vnder the line euery one in their due order and place.

Exam. I would multiply 123 by 3, that is to say, I would know how much amounteth 3 times one hundreth, twenty & thrée. The two numbers being placed in such order as is before sayd, you must begin towards the right hand: and say thus, 3 times 3 are 9: write downe 9 vnder the line, right against 3, for the first figure: secondly by the same 3, you must multiply the second figure 2, and they make 6, put downe 6 after the 9 vnder the line: Thirdly by the same

$$\begin{array}{r} 123 \\ 3 \\ \hline 369 \end{array}$$

3, you shall multiply the last figure 1, and they are but 3, set downe 3 after 6 for the third and last figure. And thus is the worke ended: wherby you shall find, that 123 being multiplyed by 3 maketh 369.

But when it happeneth that of the multiplication of one figure by another, the sum which commeth thereof shalbe of two figures, as it happeneth often, then shal you write down the first figure, and keepe the other figure to be added unto the multiplication of the next figure.

Example, 6 men haue gained (every one of them) 345 Crownes, I would know how many Crownes they had in all. First I multiplie 6 by 5, they make 30. I write 0 under the line and for 30 I doe keepe 3 to be added to the next multiplication: Secondly I say 6 times 4, are 24: unto the which I had 3, which before I reserued: And they make 27. I write 7 in ẏ second place

$$\begin{array}{r} 345 \\ 6 \\ \hline 2070 \end{array}$$

vnder the line, and I keep 2, to be added to the next multiplication: Thirdly I say 6 times 3 are 18, vnto the which I adde the 2 which I keepe, and they make 20, the which I write all downe, for because that is the last worke. And so I finde that 345 being multiplyed by 6, doe make 2070.

But when the multiplyer is of many figures, you must multiply all the whole multiplicand by euery one of those figures, & write ẏ products euery one orderly vnder his own figure,

Example. I would know how many daies are past frõ the natiuity of Jesus Christ vntil ẏ yeere 1560, full compleat. I must now multiply 1560 by 365 daies: because ther are so many daies in one whole yere. The leap yeeres not being reckoned, which haue euery one of them 366 daies.

Therfore first by the figure 5: I multiply all the higher figures saying thus, 5 times 0 maketh 0: I write 0 vnder the line for	1560 368 7800

 the

the first figure, and because I kepe nothing for the next place, I procede and say, 5 times 6 are 30: I set 0 under the line for the second figure, and I kepe 3 to be added to the next multiplication: Thirdly I say 5 times 5 are 25: The which with the 3 that I kepe are 28: I set downe 8 for the third figure, and kepe 2 to be added with the next multiplication: Then comming unto the fourth and last figure, I say 5 times 1 are 5: the which with ẏ 2 that I reserved are 7: I put 7 for the last figure of this first work by the figure 5, with the which figure I have no more to doe. And therefore I cancel the same 5 with a litle strike through it, to signify that I have finished with that figure And forasmuch that in multiplicatiō there is allways as many simple operatiōs, as ẏ multiplier containeth figures, there resteth yet 2 works to be made. I come therfore to the second work which is ẏ figure 6, by ẏ which I must againe multiply all the figures of the multiplicand

plicand as I did by 5, and the first fi-
gure (which shall be produced) I do
put one ranke more lower thā the fi-
gures of the worke now last made by
5: not right vnder the first figure of ẏ
multiplier 5, but vnder 6: that is to
say, one degrée or place néerer toward
the left hand, & one ranke more lower
than the first worke: and I must put
afterward euery of the other figures
which cōmeth of the same multiplica-
tion in their order: thirdly I do make
the multiplicatiō by the third figure,
& that which shal come thereof I must
set in his ranke, as hereafter shal ap-
peare. And now I néed make no fur-
ther discourse hereof, because that he
which can do the first multiplication
by 5, may as easily do all the others.
It shall therfore suffice to set here vn-
der ẏ exāples of all ẏ 3 sūdry works.

	1560	1560
1560	65	356
5	7800	7800
7800	9360	9360
	101400	4680
		569400

Now, if you will know how much all the three workings thus placed, doe amount vnto, which in value must be but one number : you must adde all yͤ numbers which are come of all the 3 multiplications together, but not after the same manner as we haue done in the Chapt. of addition, the first fygure of the first rank with the first figure of the second ranke, & so of the third : but you must adde them in the same sort as you shal find them scituated and placed : that is to say, the first figure of the first ranke alone by it selfe: the second of the first rank with the first of the secōd rank. The third of the first ranke with the second figure of the second ranke, and with the first of the third rank: & so of al yͤ other as hereafter doth appeare.

And thus the 1560 yeares doe contayne fiue hundreth sixty & nine thousand foure hundreth dayes, not counting herein the

	1560
	365
	7800
	9360
	4680
	569400
	dayes

dayes of the leape yeares, which are here in number 390 for then ẏ whole sum of the daies should be 569790.

Another example.

```
    34560
     2456
---------
   207360
  172800
 138240
 69120
---------
 84879360
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The summe of Multiplication is thus, when you would multiply any number by 10, you shal only put one cipher 0 before all the numbers, that is to say, a degree neerer ẏ right hand as 345 multiplyed by 10 maketh 3450. If you wil multiply any nũber by 100, Add to the same number two ciphers thus, 00, if by 1000 add 000. And to be briefe, when the last figure of the multiplyer is 1, and all the rest be ciphers, adde so many ciphers to your multiplicand, as there shall be

found

found Ciphers in your multiplyer. But if in your multiplying, the last figure were not 1, but that there were onely certaine ciphers in the beginning: and that the other were signifying figures, and likewise those of the multiplicand, then shal you put those ciphers a-part, & multiply the signifying figures of the one by the signifying figures of the other. Then adde unto the product of that multiplication, all the ciphers which you did before put a-part. As if I would multiply 46000 by 3500. I put apart the thrée ciphers of the first, and the two ciphers of the second numbers which are in all 5 ciphers 00000: And then I multiply 46 by 35, & thereof commeth 1610: Before ỹ which toward the right hand, I adde the 00000 that I did put apart, and then the whole product wilbe 16100000.

```
    46
    35
 ---------
   230
  138
 ---------
 161000000
```

Of

Of Diuision.

Diuision or Partitiō is, to seeke how many times one nūber doth containe another, or else how often times one number may be found in another, for in yͤ work of Diuision there are required two numbers, to be first known, for the finding out of the third. The first number known, is called the diuidend or number which is to be diuided, and that must be the greater number, the second number is called the diuisor, and that is the lesser. And the third number which I do seek, is called the quotient. As if I would diuide 36 by 6, the diuidend shal be 36: and the diuisor is 6. and for because that 9 is cōtained in 36, 4 times, that is to say, 4 times 9 doe make 36: the quotient shall be 4, as if you marke well, how many times 9 is con-

tained 36, you shall find it 4 times: and therefore 4 shalbe the quotient.

The Practise.

Write downe first the dividend in the higher number, and the diuisor underneath in such sort, that the first figure of the diuisor toward the left hand be vnder the first figure of the diuidend, & euery figure of ẏ same diuisor vnder his like, that is to say, the first vnder the first, the second vnder the second, the third vnder the third, and so consequently of the other, if there be so many, which is contrary to the other three kinds before specified, but yet you must consider further if all the lower figures of the diuisor, may be taken out of ẏ higher figures of ẏ diuidend by the order of substraction or not. The which if you cannot do, then must you set the first figure of the diuisor (toward the left hand) vnder the second figure of the diuidend, and so consequently the rest in their due order, if any be to be set downe,

euerie one of them vnder his like, as before is sayd. And then draw a line betweene the diuidend and the diuisor. And at the end of them another crooked line, behind the which toward the right hand shall be set your quotient. As by this example following, where the diuisor is but of one figure.

If you would diuide 860 by 4, you must set downe 4 vnder the 8 with a line between them, as heere vnder you may see.

The Diuidend.	860
Diuisor.	4

And then you must seek how many times the diuisor 4 is contained in ẏ higher nũber, that is to say in 860, the diuidend answering to him, as in this our example I must seeke how many times 4 is cõtained in 8, in the which I find it 2 times, then I write down 2 apart behind the crooked line as heere you may see, which shal be the first fygure of the quotient to come, secondly by this figure 2 (being thus

thus put apart) I must mul- 860
tiply the diuisor 4 : and vn- 4 (2
der the same multiplication. 8
I must set that nūber which
cōmeth of the same multiplication as 2 times 4 do make 8, ye which 8 I do set vnder the diuisor 4. Thirdly, I do substract the product of the said multiplication (of the quotient by the diuisor) that is to say, 8 from the higher number correspondent to the same, in saying 8 from 8 there remaineth nothing, and then I cancell or strike out that which is don as you sée. In these thrée operations and workes is comprehended the Art of Diuision. The which are to be obserued from point to point, for there is no diuersitie in ye finishing of the same which is thus.

Now secondly I must remoue my diuisor one place néerer toward my right hand, as in procéeding
with our example. Here you 2
sée I remoue my diuisor 4, 8̸6̸0̸ (21
which was vnder 8, and I 4
set it vnder 6, then I séeke how many times

4 is contained in 6 : where I find it but one time, then I set 1 behind the croked line next vnto ẏ first figure of ẏ quotient 2, a degree or place neerer my right hand, afterward by this last & new figure 1, I multiply ẏ diuisor 4, & that maketh but 4 (for an vnity which is but 1 encreaseth nothing) I abate therefore 4 from the higher figure 6, and there resteth 2, the which 2, I set ouer the 6: & I cancell the 6, for so I must do whē there resteth any thing after I haue made ẏ subtraction. Thirdly for as much as there yet remaineth another figure in the diuidend, I remoue again ẏ diuisor, and I set it vnder the cipher 0. Then I seeke how many times 4 is in the higher number which is 20, where I may find it 5 times, I put therefore 5 behind the croked line for the third and last figure of ẏ quotient. Thē by the same 5, I multiply ẏ diuisor 4, and ẏ maketh 20, the which 20 I abate

```
   2
 860(215
   4
 420
```

bate from the higher number, & there resteth nothing. And so is this diuisiō ended: & thus I haue found that 860 being diuided by 4 bringeth for the quotient 215: that is to say, that 4 is contained in 860, two hundreth & fifteene times. This is the most easiest working that is in diuision, but that which followeth, appertaineth to the whole and perfect understanding of the same. When the first figure of your diuisor toward your left hād, is greater than the first of the diuidend, you must not place the first figure of your diuisor right vnderneath ẏ first of the diuidend, but vnder the second figure of the same diuidend, next to your right hand, as before is said Therfore when the diuisor is of many figures, & that you haue to seeke how many times it is cōtained in ẏ higher number (for the more easier working) you must not seeke to abate the diuisor all at one time, but you must see & mark how many times ẏ figure of the same toward ẏ left hand is cō-

tained in the higher number answe-
ring to the said number, and then to
worke after the same manner as is
before taught.

Example, I haue 31621 5 crowns
to be diuided among 45 men, and for
to make my diuision, I must not put
the first figure of the diuisor which is
4, vnder the first of the Diuidend
which is 3, because that 4 is a greater
number than 3. And further, you
know, that I cannot take 4 out of 3,
wherfore I must set the 4, vnder the
second figure of the higher number,
that is to say, vnder 1, and the figure
5, of the diuisor, right vnder the 6, as
here you may see.

So that I must first seeke, how many times 45, is contained in 316, which is but part of the Diuidend.

3 1 6 2 1 5
4 5

Wherefore for ye more easy working
I need but to seeke how many times
4, is contained in 31. And because I
may haue it 7 times, I put 7 behind
the croked line, as is aforesaid: then

by 7, I multiply all the diuisor 45 and they are 315: the which I set vnder ye same diuisor ye first figure vnder the first: and the other in order towards the left hand. Then I substract 315, from the higher number 316: and of this first working there remaineth but 1, the which I set ouer the 6, and I cancell likewise the 315, and the other figures 316, and also the diuisor 45: and then it will stand thus as in the margent.

```
  1
~~316~~215
---------
~~45~~   (7
~~315~~
```

And when I come to remoue the diuisor, and that I must seeke how many times it is contained in the higher number, if I see that I cannot find it there, that is to say, that if the higher number be lesser than ye diuisor, as it is in this example, then must I put a cipher in the quotient behind the crooked line, and if there remaine any figures in the diuided which are not yet finished: I must remoue the diuisor again neerer toward my right

hand by one place, for to find a new figure in the quotient. As in this our example, for after that I haue remo-ued ẏ diuisor, I seeke how many times 45, is contayned in 12: and because I cannot haue 45 in 12, I put a 0 behind the croked line after 7: thē without multiplying or abating.

$$\begin{array}{r} 1 \\ \cancel{3}\,\cancel{1}\,\cancel{6}\,2\,1\,5 \\ \hline 45\ (70 \end{array}$$

I remoue againe the diuisor neerer towards my right hand, and I seeke how many times 4, (which is ẏ first figure of the diuisor) is in the higher number, ẏ is to say, in 12, whereas I find it 3 times: I put 3 behind the croked line, for the third figure of the quotiēt: then by the same figure 3, I multiply the diuisor 45, and thereof commeth 135. And in the number ouer it there is but 121, so ẏ I cannot take it out of 121, which is the lesser number. And therefore here is to be

$$\begin{array}{r} 1 \\ \cancel{3}\,\cancel{1}\,\cancel{6}\,2\,1\,5 \\ \hline 45\ (703 \\ 135 \end{array}$$

noted, that if it happẽ, that the figure being last found which is put in the quotient, doe produce or bring forth a greater number (in multiplying all the diuisor by the same) than ye which is ouer the said diuisor: you must then make the same figure of your quotiẽt (which you doe put downe) lesser by 1, and after that you haue cancelled ye first multiplicatiõ, you must make a new. And the same must be done so oftentimes: as (in decreasing the same) it may produce a lesser nũber, or at the least a number equal to that which is ouer it, as in the last worke, for because that the diuisor, being multiplyed by 3, bringeth forth 135, which amounteth more than 121. Therefore the same product must be cancelled, and the figure 3 which I did put in the quotient, must be also changed into a figure of 2. Then by the said 2, I must multiply the diuisor 45, and thereof commeth 90, the which I abate from 121, & there remaineth 31. And then will the sum

stand

stand thus as followeth.

13

31625 15

48 2

135 (703

66

And here is also to be noted, that the summe which remaineth must be alwaies lesser then the diuisor. Then finally I remoue the diuisor to the 2 next figures towards the right hand, and I seeke how many times 4 is in 31, & for because I find it 7 times, I put 7 in the quotient, by the which I multiply the diuisor, and thereof commeth 315, the which I abate from the higher number of the diuidend, & there remaineth nothing as here you may see.

18

316215

48 (7027

315

But if it happen that after the diui-

sion is ended, there doe remaine any thing in the diuidend, as oftentimes there doth; I must also set them that remain apart behind the crooked line, after the entire quotient, and the diuisor right under the same remaine, with a line betwéen them both. As in this diuision following, where there remaineth 3 in the last worke. And what the same doth signifie shall bée taught vnto you when I shall treate of fractions or broken numbers.

i.

$$\begin{array}{l} \quad 1\,1 \\ \cancel{4}\cancel{6}\cancel{7}\,8\,5\,9 \\ \hline \cancel{4}\cancel{5}\cancel{6}\ (1 \end{array}$$

ij.

$$\begin{array}{l} \quad 1\,1 \\ \cancel{4}\cancel{6}\cancel{7}\,8\,5\,9\ (10 \\ \hline \cancel{4}\cancel{5}\cancel{6} \end{array}$$

iij.

$$\begin{array}{l} \quad 2 \\ \cancel{1}\cancel{1}\,7\,3 \\ \cancel{4}\cancel{6}\cancel{7}\cancel{8}\cancel{8}\,9 \\ \hline \cancel{4}\cancel{5}\cancel{6} \\ \cancel{0}\cancel{1}\cancel{2}\ (102 \end{array}$$

iiij.

$$\begin{array}{l} \quad 2 \\ \cancel{1}\cancel{1}\cancel{7}\cancel{3}\,3 \\ \cancel{4}\cancel{6}\cancel{7}\cancel{8}\cancel{8}\cancel{0}\qquad \frac{3}{456} \\ \hline \cancel{4}\cancel{5}\cancel{6}\ (1026 \\ \cancel{2}\cancel{7}\cancel{3}\cancel{6} \end{array}$$

In

In summe, all the whole practise of diuision may be kept in remembrãce by thrée letters, that is to say: S, M, and A, which thrée letters do signifie to séeke, to multiply, and to abate.

First I must séek how many times the deuisor is contained in the higher number: then by the quotient (which I find) I must multiply the diuisor: finally, I must abate the product of that multiplication, from the higher number correspondent to the same, that is to say: out of the diuidend, answering to the diuisor.

And further, besides this kind of working in diuisiõ. The which is regular and commune: I will here put another mãner of working very easy The which shall serue for such diuisions as are more difficil to be wroght. That is to wit, when ẏ number to be diuided is very great, and the diuisor great also, and it shal serue againe for to auoide errour in supputacion, and for the placing of fewer figures in the quotient: & consequently it shall saue much

much labour vnto them which as yet haue not much studied in this Art. The practise whereof is thus as followeth.

If you would diuide 7894658, by 643. First you shall vnderstand, that although the figure of the diuisor toward your left hand, may be found many times in the higher number, as 10 times, 12 times, or more: yet is it so, ỹ you must neuer put but one figure only at a time in your quotient. And you shall at no time put any nũber in your quotient which excéedeth the figure of 9, that is to say, any nũber being greater thã 9. And therfore for to come vnto your practise, write downe your diuisor one time, and behind it towardes your right hand, draw a line downe straight, & right against the same diuisor behind the line toward ỹ right hand, put this figure 1. Thẽ double your said diuisor & right against the same which yoũ haue doubled, put behind the line the figure of 2. This done you shall adde

vnto the same number that you doubled your said diuisor, & right against the same product, behind the line you shall put the figure of 3 and vnto this third product you must adde againe your diuisor, and right against the same product behind the line, set the figure 4. And thus must you doe vntill you come to the figure of 9, in such sort, that euery of the products doe surmount so much his former nūber, as all the diuisor doth amount vnto: placing at the right side of euery product behind the line, the number which signifieth how much he is in order. That is to say, right against the fift product, you must put 5, and right against the 6 product, you must put 6: and so likewise of all the other.

The Example followeth in the next page.

Example

Example of the diuiſor proponed, 643: First of all I write down 643, and right againſt the ſame behinde the line towards my right hand, I put 1: ſecondly I double 643: and they make 1286: & right againſt ẏ ſumme behinde the line, I put 2. Thirdly, vnto that ſame 1286, I add the diuiſor 643, and they are 1929, & right againſt the ſame I ſet 3. Fourthly, vnto the ſaid 1929: I adde the diuiſor 643, and they make 2572: & right againſt the ſame I put 4. And thus muſt you do allwayes by encreaſing ſo much euery product, as the diuiſor doth amount vnto, vntill you haue ſo done nine times, as you ſee in this preſent Table.

643	1
1286	2
1929	3
2572	4
3215	5
3858	6
4501	7
5144	8
5787	9

This being done, you muſt ſette down your diuiſor vnder the diuided 7894658,

789465 8, after the same maner as is before declared: ỹ is to say, 643, under the thrée first figures of the diuidend toward your right hand, namely vnder 789. Then must you séeke how many times 643, are contained in 789: And for to know ỹ same, you must looke in the foresayd table if you may there find the same number 789 the which is not there. Therefore you must take a lesser number, the néerest to it in quantity that you can find in the table, the which is 643, which number hath against it on the right hand of the line, this diget 1. Then take the said 1, and put it behind the croked line, for the first figure of the quotient.

Then you must abate 643, from 789, and there will remaine 146, the same shall you put ouer the 789, and cancell the 789: and thus is the first worke ended. Then set forward the diuisor one figure neerer to your right hand, and séeke a new quotient as you sought this, where you find the

higher

higher number ouer your diuisor to bee 1464. The which seeke in the Table, & for because you cannot find it there, you must take a lesser number, the neerest to it that you can find & that is 1286: which number hath against it this diget 2. Therefore you must put 2, for the second figure of the quotient behind the line, and then abate 1286, from the said 1464, and there will remaine 178. Thirdly, remoue forward the diuisor as you did before, and you shall find the higher number ouer it to be 1786, so that the next lesser number to it in your table, is againe 1286, put therefore once againe 2, in the quotient for the third figure: and abate the said 1286, from 1786, so there will remaine 500.

Fourthly, set forward the diuisor: & the higher number ouer it, is 5005, & the next lesser nūber to it in your table, is 4501, right against the which is 7, put 7 in the quotiēt, for ẏ fourth figure. And after that you haue abated 4501, from 5005: there will remaine

maine 504. Finally remoue forward your diuisor vnto the last place, and you shall find the higher number o-uer it to be 5048. And the next lesser number to it in your table, is 4501. Therfore set 7, again in the quotient for the fift and last figure. Then sub-stract 4501. from 5048, & there will remaine 547: which must be put at the end of the whole quotient, with ẏ diuisor vnder it, and a line betweene them in this manner following.

$$12277 \frac{547}{643}$$

The summe of diuision.

When you would diuide any number by 10, you must take away the last figure next towards your right hand, and the rest shall be the quotient. Example: As if you would diuide 46845, by 10: take a-way the 5, and then 4684 shall be the quotient, & the 5 shalbe the number that doth remaine. Likewise when you would diuide any number by

100,

100, take away the two last figures towards your right hand, and if you shoulde diuide by 1000, take away thre figures, if by 10000, take away foure figures. And so of all other, whē the first figures of the diuisor toward the left hand shall be onely 1, and the rest of the same diuisor being but ciphers.

Here follow the proofes of Addition, Substraction, Multi-*plication, and Diuision.*

The proofe of Addition.

WHen you wold proue whether your addition be well made, cōsider ẏ figures of ẏ numbers which be added, euery one in his simple value, not hauing any regard to the place where he stādeth, but to reckō him as though he were alone by himselfe, & then reckon them all

all one after another, casting away from them the number of 9, as oft as you may. And after your discourse made keepe in mind the same figure, which remaineth after the nines be taken away: or else set the same in a voide place at the upper end of a line. For if your addition be well made, the like figure will remain, after that you haue taken away all the nines out of the totall summe of the same addition, as often-times, as you may there find any: as in this addition which heere you see, there remaineth 2, for each part.

24567	2
5329	
481	
30377	2

The proofe of Substraction.

ADde the number which you do substract unto ỹ number which remaineth after the substraction is made, and if the totall summe of that addition be like unto the number, frō the which the substractiō was made,

you haue done well, otherwise not as in this example doth appeare, where you see the number which is to be substracted from 5463, is 3584, and the number which doth remaine, is 1879, the which 2 sums being added together do make 5463, which is like to the higher number, out of the which the substraction was made, as before is sayd.

5463
3584
1879
5463

The proofe of Multiplication.

The proofe of Multiplication is made by the helpe of diuision. For if you diuide the number produced of the multiplication, by the multiplier, you shall find the higher number which is the multiplicand.

The proofe of Diuision.

To know if your diuision be well made: you must multiply all the quotient by your diuisor, and if any thing do remaine after your diuision is made, the same you shall adde vn-

to the product which commeth of the multiplication, and you shall find the like nūber vnto your diuidend, if you haue well diuided: otherwise not.

Chap. 6.

Of Progression.

Progression Arithmeticall, is a briefe and speedy assembling or adding together of diuers figures or nūbers, euery one surmounting the other cōtinually by equall difference, as 1, 2, 3, 4, 5, &c. Heere the difference, from the first to the second, is but of 1, and so doe all the other, euery one exceed his former figure by 1 stil to the end. Likewise 2, 4, 6, 8, &c. doe proceed by the difference of 2. Also 3, 6, 9, 12, &c. doe euery one differ from other by 3. And so may these numbers continue, infinitely after this order, in adding vnto the 3 number, ỹ quantity wherein the 2 doth differ from the 1; Likewise adding the same difference vnto the 4 nūber, also to the 5, and so vnto all the other: as 1, 4, the difference of the second to the first is three, and

Progreſsiō Arithmeticall.

3 vnto 4, and they are 7 for the third number. Thē adde 3 vnto 7, and they make 10 for the fourth number, and so of all other.

Then if you will adde quickly the number of any progression, you shall doe thus, first tell how many nūbers there are, and write their sūme down by it selfe, as in this exāple, 2, 5, 8, 11, & 14, where the number of their places are 5, as you may see therfore you must set down 5 in a place alone as

5. I haue don here in the margēt. Then shall you adde the first number & the last together, which in this example are 14 and 2, and they make 16, take halfe therof which is 8, and multiply it by the 5 which I noted in the margēt, for the number of the places. And the summe which amounteth of that multiplication, is the iust summe of all those figures added together. As in this example: 8 multiplyed by 5 do make 40. And that is the totall sūme of al the figures. Another example of parcels ÿ are euē, as thus 1, 2, 3, 4, 5,

and

and 6. So that in this example you muſt likewiſe note downe the number of the places, as before is taught and then adde together the laſt number & the firſt. And the ſum which commeth of that addition, ſhall you multiply by halfe the number of the places which before are noted, and that which reſulteth of the ſame multiplication, is the whole ſumme of al thoſe figures, as in this former example, where the number of the places is 6, I note the 6 apart, and then I adde 6 and 1 together: which are the laſt & firſt numbers, and they make 7, the which I multiply, by 3 which is halfe the number of places, & they make 21, and to ſo much amounteth all thoſe figures added together.

Queſtions done by Progreſſion Arithmeticall.

1. A Marchant hath ſold 100 kerſies after this manner following, that is to ſay, the firſt péece for

1 s. the second peece for 2 s. the third for 3 s and so forth, rising 1 s. in euery peece of Kersey unto the hundreth peece. The question is to know, how much he shall receiue for the said 100 peeces of Kerseis? *Answ.* It behoueth you to know the addition of the 100 termes in this progression: And therefore you must adde 1 s. which is the price of the first peece with 100 s: which is the price of the last peece, & thereof commeth 101. the same 101 you must multiply by halfe the number of places, that is to say by 50, and thereof commeth 5050 s. which being diuided by 20 s. therof will come 252 li. 10 s. 0 d. which is 2 li. 10 s. 6 d. a peece, one with another. Thus the 100 Kerseis are sold by the sayd Marchant for 252 li: 10 s. 0 d. The practise followeth.

```
 100
   1          1   1
 ----
 101        5050  (252 li. 10 s.
  50        2220
 ----
 5050
```

Questions

Questions of Progression.

2 I would lay 100 stones or other things in a right line, and every of the said stones to be a iust pace one from another, & one pace off from the first stone, there standeth a basket. I demaund how many paces a man shall goe in gathering up the sayd stones, and bearing them unto the basket, ye 1 stone after the other? 4.f. First when he fetcheth the first stone and putteth it into the basket, hee maketh 2 paces, for the second 4 paces, for the third 6 paces, for ye fourth 8: & so forth unto ye last stone: wherefore the last terme shall be 200, unto the which you must adde the 1 terme which is 2, & they make 202, whereof the halfe is 101, the which you shall multiply by 100, which is the number of the termes in your progression, or else multiply 202 by 50, which is halfe the number of places, and thereof will come 10100 paces, and so many paces shall he goe in all.

Queſtions of Progreſſion Arith-
meticall.

3 There is a meſſenger which go-
eth euery day 8 miles: an other
man followeth him incontinently, &
he goeth the firſt day 1 mile, the ſecõd
day 2 miles, the third day, 3 miles,
and ſo encreaſing his iourney, euery
day one mile by naturall progreſſion.
The queſtion is to know in how ma-
ny daies the ſecond man ſhall haue
ouertaken the firſt. Anſwere. You
muſt conſider that 8 is the middle or
halfe as well of the termes, as of the
number of the daies: And therefore
double 8 therof commeth 16: ſubſtract
1, and there will remaine 15: and in
ſo many daies ſhall he haue ouertakẽ
the firſt meſſenger. The proofe therof
is very eaſy. If the ſecond had gone
the firſt day 2 miles, the ſecõd day 4
miles, the third day 6 miles, and ſo
encreaſing euery day his iourney, by
2, In how many dayes ſhould hée
haue ouertaken the firſt man, for to
doe

doe this you must perceiue that 8 is the middle and fourth terme. Therefore double 4 and they make 8, from the which subtract 1, and there remaineth 7, and in so many daies hée should haue ouertaken him.

Questions of progression Arithmeticall.

4 There is one man departeth from London to Chester, and so to Carnaruan, the distance béeing about 200 miles: He goeth the first day 1 mile, the second day 2 miles ẏ third day 3: and so orderly by naturall progression. Another man departeth at the same instant from Carnaruan to London, and goeth the first day, 2 miles: the second day, 4 miles: the third day 6 miles: and so encreasing euery day 2 miles. The Question is, to know, in how many daies they two persons shall méete together. Answere: First you must consider, that hée which goeth by Progression naturall

natural, maketh but halfe the way ÿ the other doth, so that he shall haue made but the one $\frac{1}{3}$ part of the way, at their meeting together. Take therefore the $\frac{2}{3}$ part of 100, and you shall haue 66 $\frac{2}{3}$. Then must you seeke 2 numbers, whereof the greater of thē, may be double vnto ÿ other, lesse 1, & that ÿ 1 of thē being multiplyed by the other, the product of thē may be 66 $\frac{2}{3}$, or little more, so that the more do not exceede the valew of ÿ greater terme as here in this question the 2 nearest numbers are 12, and 6 $\frac{1}{2}$, which multiplied the one by the other doe make 78, which is 11 $\frac{1}{3}$ more then is 66 $\frac{2}{3}$, wherefore that day when they should meete together, the first had gone but $\frac{2}{3}$ of a mile of his iourney, which was vpon the 12 day & then if you will knowe what part of a day that they did meete, you must diuide $\frac{2}{3}$ by 12, and you shall find $\frac{1}{18}$ of a day. Therefore in 11 daies and $\frac{1}{18}$ part of a day that is vpon ÿ twelfth day, they shal meete together.

5 If a man doe owe mee 1000 crownes, to be payd in 20 daies, or termes, by Arithmeticall progression: The question is, to know with what number he shall begin and continue his progression. *Answ.* To doe this, you must adde 1 unto 20, and they make 21, the which you shall multiply by 10, which is halfe the number of places, and thereof commeth 210, and therefore divide 1000, by 210, and thereof will come 4 $\frac{16}{21}$, the paiment of ÿ first day, & by this number, doth the sayd Progression encrease in this sort following 4 $\frac{16}{21}$, 9 $\frac{11}{21}$, 14 $\frac{6}{21}$, 19 $\frac{1}{21}$, &c. And so of all others.

A man oweth me 400 li. to be paid in 10 yeeres, by progression Arithmeticall, ÿ is to say, 40 li. at the end of the first yeare, and every yeare following 40 li. to the end of 10 yeares: he offereth to pay me the said 400 li. all at one paiment. The question is to know, at what time he ought to pay me the same at one paiment, that I

bee

be not enteressed in the time? *Answ.* adde 1 unto the number of the terms which are 10, & they make 11, wherof you must take the halfe, that is to say $5\frac{1}{2}$: Therefore he must pay me at 5 yeare and $\frac{1}{2}$ the said 400 li. all at one time: for ÿ which he paieth before, is equal to ÿ which remaineth unpaied. This rule hath place onely when the paiments are equall. But if it happē, that the last paiment be lesser than ÿ others you must in this case, put ÿ last paiment over one of the others, for to make therof a fraction: ÿ which must bée added unto the number of the termes, and the halfe of the said sum being taken, shal shew the time, ÿ the said paimēt ought to be paid at once. As if ÿ said party did owe me but 380 pounds, to be paid every yere 40 l. it is certain ÿ he must have 10 yeres to end the paiments. And it is true, ÿ upō the 10 day there would remaine but 20 li. to be paid: And therfore put 20 over 40 in this sort $\frac{20}{40}$ & that maketh $\frac{1}{2}$, ÿ which you shall ad unto the number of termes, and you shal have

10 ½, whereof the halfe which is 5 ¼, doth shew that hée must pay the sayd 380 li. at 5 yeares ¼, all at one payment, and so of all such like.

Progression Geometricall is whē the secōd number containeth the first in any proportion: as 2, 3, or 4 times, and so forth. And in like proportion shall the third number contain the second, and the fourth number contain the third, and the fift the forth, &c. As 2, 4, 8, 16, 32, 64: here the proportion is double.

Progression Geometricall.

Likewise 3, 9, 27, 81, and 243: are in triple proportion.

And 2, 8, 32, 128 and 512, are in proportion quadruple.

That is to say, in the first example, where the proportiō is double, euery number containeth yͤ other 2 times, as 4 containeth 2, two times: 8 containeth 4, two times. &c. In yͤ second example of triple proportion, the nūbers excéede each other thrée times. And in yͤ third example, the numbers excéede each other foure times, & thus you

you see that *Progreßion Arithmeticall*, differeth from *Progreßion Geometricall*, for that, that in *Progreßion Arithmeticall*, the excesse is onely in quantity, but in *Progreßion Geometricall*, the excesse is in proportion.

Now if you wil easily find the sum of any such numbers, you shal do thus consider by what number they be multiplied, whether they bee multiplied by 2, 3, 4, 5, or by any other: and by the same number, you must multiply the last sum in the Progression: And from the product of the same multiplication, you shall abate the 1 number of y^e progression: And that which remaineth of the sayd multiplication, you shal divide by 1 lesse then was y^e number by the w^{ch} you did multiply, & y^e quotient shal shew you the sum of al y^e numbers in any progression. As in this example, 5, 15, 45, 135, 405: which are in triple proportion: Now multiply 405, which is the last number, by 3: because they are in triple proportion, and they are 1215, from the which

you

you ſhall abate the firſt nūber of the progreſſiō, which is 5, & there remaineth 1310 the which you ſhal diuide by a number leſſe by 1, thē that was by the which you did multiply, that is to ſay by 3: and you ſhal find in the quotient 6o3: which is the totall ſum of the numbers of that progreſſion. Likewiſe 4, 16, 64, 256, and 1024, which are in proportion quadruple: therefore you ſhal multiply 1024, by 4, and thereof will come 4096, from the which abate the firſt number 4, and there will remaine 4092: The which you muſt diuide by 3, and you ſhall find in your quotient 1364: which is the totall ſum of that progreſſion, and this ſhall be ſufficient for progreſſion.

A queſtion of Progreſſion Geometricall.

A Marchant hath ſold 15 yardes of Satten, the firſt yard for 1 s. the ſecond 2 s. the third 4 s. the fourth 8 s. and ſo encreaſing by double progreſſion Geometricall. The queſtion is

is to know how much the said Marchant shal receiue for ŷ said 15 yards of Satten: *Answ.* First it is needfull to know how much the whole numbers of the said progressiō do amount vnto together. And for to do it you must find the last terme, therfore you must set downe the said progression vnto the 8 terme, which is 128: the which you shall multiply by it selfe, and thereof commeth the fifteenth terme, that is to say, 16384: the same shall you multiply by 2, for because ŷ progression is double. And thereof wil come 32768 from the which you must substract the first terme which is 1. And the rest being 32767, is the iust summe of the 15 termes: and consequently the 15 yards of satten shalbe worth 32767 shillings, the which are 1638 li.

7 8.

Chap. 7.

Of the rule of three, called the *Golden rule: or the rule of foure Proportionals.*

The rule of thrée is the chiefest, ye most profitable, & the most excellent Rule of all the rules of Arithmeticke. For all other rules haue néed of it, and it passeth all other, for the which cause it is said, that the Philosophers did name it the Golden rule. And after others opinion and iudgement it is called the rule of proportiō of foure nūbers. But now in these later dayes, by vs it is called the rule of thrée, because it requireth thrée numbers in his operation. Of the which thrée nūbers, ye 2 first are set in a certain proportion, and in such proportiō as they be stablished, this rule serueth to find out vnto the 3 number, the 4 number to him proportioned, in such sort as the 2 is proportioned vnto the first. Not for that, that the foure nūbers, nor yet the thrée, are to bée proportionall,

portionall, or set in one proportiō, but such proportion, as is from the first to the second, ought to be from the third unto the fourth, that is to say, if the second number doe containe the first two times or more, so many times shall the fourth number containe the third. And note well that the first nū-ber, & the third, in euery rule of thre ought and must be alwaies of like de-nomination, and of one condition & nature. And the second number, and ẏ fourth, must likewise be of one se-blance and likenesse, and are dissem-blant, and contrary to the other two numbers: that is to say, to the first, & the third. And if you do multiply the first number by the fourth, & the se-cond number by the 3, the products of your two multiplications will be equall. Likewise if you diuide the one semblant by the other, that is to say, the third number by the first, & like-wise the one dissemblāt by the other, that is to say, the fourth number by ẏ second (which are dissemblant to the

other

other two numbers) your two quotients will also be equall.

The stile and manner of this rule is thus; you must set downe your three numbers in a certain order, as by example following shall appeare. And then you shall multiply the third nūber by the second, and the product or number that cōmeth of the same multiplication, you must diuide by ye first number: or otherwise, diuide the first number by the second, & the quotient thereof shall be your diuisor vnto the third number, that is to say, the third number shalbe diuided by the quotiēt of the aforesaid diuision, that is by the quotient of the first nūber diuided by the second. Or otherwise, diuide the second number by the 1, & that number which cōmeth into your quotiēt, you shall multiply by the third number. And thus shall you haue ye fourth nūber which you seeke for. And thus is your fourth nūber in such proportion vnto the third, as your second number is vnto the first. Rule.

Example.

If 8 be worth 12, what are 14 worth, after the rate: or else if 8 require 12 for his proportionall, what will 14 demaund? The which three numbers may conueniently be set in such order, as herafter doth appeare.

If 8 make 12, what will 14 make? you must multiply the third number 14, by the second which is 12, and thereof commeth 168 for the whole product of this multiplication: the which (as the rule teacheth) you must diuide by the first number, that is to say by 8, & therof commeth 21. And so much are the 14 worth. This is the way which is most vsed.

			14
			12
8..	12..	14..	28
			14
$\cancel{1}\cancel{6}\cancel{8}$ / $\cancel{8}\cancel{8}$	21.		168

Otherwise

Otherwise diuide 8 by 12, 2
which you cannot doe, for 4
they are $\frac{8}{12}$, wherefore abbre- 8
uy $\frac{8}{12}$, and they are $\frac{2}{3}$ for your 12
quotient, then diuide the third 6
number 14, by the said $\frac{2}{3}$, mul- 3
tiplying 14 by 3, which maketh 42: diuide 42 by 2, and you shall haue 21, as before. Or else diuide the second number 12 by the first nūber 8, and thereof cōmeth 1 $\frac{1}{2}$, the which 1 $\frac{1}{2}$, your shall multiply by the third number 14, and thereof will come 21, as is aboue said; and thus must you doe of all other: and although, that the numbers of this rule may be found in thrée differences, for sometimes they are whole numbers and broken together, sometimes broken number, and brokē together, & sometimes all whole numbers: if they bée whole numbers, you must doe none otherwise, then you did in the last example. But in cause they be broken numbers, or broken and whole numbers together, the maner and way to

doe them, requireth a certaine varia-
tion and difficulty, according to the
variety of the numbers that shall bée
proponed: the which operation easily
to doe, and vnuariably, this rule tea-
cheth.

The thrée numbers being set downe
according vnto the order of the whole
numbers aforesaid, without any bro-
ken number, let 1 be put alwaies vn-
derneath euery whole number, with
a line betwéen them fraction-wise, as
thus $\frac{8}{1}$, and that 1 is denominator to
euery such whole number. But whē
you haue whole number and broken
together, they must be reduced & ad-
ded with their broken number, and if
there be broken number without any
whole number, the same brokē must
remaine in their estate.

The rule of three in Fractions.

This being done, you shal multiply
the denominator of the first number,
by the numerator of the second, and

mul-

multiply the product therof again by the numerator of the third number. And so shall you haue the diuidend or number which must be diuided, then multiply the numerator of the first number, by ye denominator or the second, and multiply again the product therof, by ye denominator of the third number, and that which commeth of this multiplication, shalbe your diuisor. Then diuide the number which is to be diuided by ye diuisor, and you shall find the fourth number that you séeke. Of the which maner and fashions, of the rule of 3, are diuers kinds, whereof the first is of 3 whole numbers, as was the last example, & here followeth the second.

If 15 pounds do buy me 2 clothes, how many clothes will 300 pounds buye me of the same price, that the 2 clothes did cost? set down your thrée numbers thus.

The example followeth in the next page.

b4

Lib.	Clothes.	Lib.	
15.	2,	300.	
		2	
		600	(40

And than as you see, you must multiply the 3 number with is 300 li. by 2, which is the second number, and thereof commeth 600, the which 600 you must diuide by the first number 15, and you shall find in your quotient 40, which is 40 clothes, & so many clothes shall you buy, for 300 li. as appeareth by practise heere aboue written. And here you must marke ÿ the first number and the third in this question be of one denomination, as before I haue declared, and likewise the 2 and the fourth numbers which you haue found, are of one semblãce & likenesse, but in case that the first number and the third in any questiõ be not of like denominatiõ, you must in (working) bring them into one denomination, or nature, as in this example

ample following. If 12 nobles doe gaine me 6 french crowns, how many french crownes will 48 pounds gaine me? Here you see that the denomination of the first number, is nobles, and the Denomination of the third, is pounds: wherefore, before you do procead to worke by ye rule of three, you must first turne ye pounds into nobles, in multiplying 48 pound by three nobles, and they make 144 nobles, for that there is in everie pound of money 3 nobles, or otherwise if you will, you may bring the first number being 12 nobles, into pounds by dividing them by 3, and thus shall your first and third numbers be brought into one denomination: then shall you set downe your 3 numbers in order, thus.

If 12 nobles do gaine me 6 french crownes, what shall 144 nobles gaine? the which 144 are the nobles which are in 48 li. Then multiply the third number 144, by the second number 6, and therof commeth 864,

the

the which you must diuide by 12 nobles, and thereof cōmeth 72 French Crownes.

And so many French Crowns will the 144 Nobles gaine me.

Nobles.	*Crownes.*	*Nobles.*
12.	6.	144.

144	~~1~~~~2~~~~0~~	*Nobles.*
6	~~8~~~~6~~~~4~~	(72
864	~~1~~~~2~~~~2~~	
	~~1~~	

There is yet a more exact way, wherby to worke in the rule of three, which is thus. You must marke if ẏ third and first numbers in the rule of three, may both be diuided by one like diuisor: the which after you haue diuided thē, you shall write downe each of the quotients orderly in the said rule of 3, euery one of thē in his own place, as though those were 2 of the numbers of your question, and not changing the middle number, that is

to

to say ẏ second. As thus, if 50 crowns doe buy mee 44 yards of cloth, how many yardes shall I haue for 120 Crowns? Here you may see that the third and the first numbers, may be diuided by 10, which in the third nũber, is found 12 times, and in the first 5 times. Wherfore you shal put 12, for the third number in the rule of three, in stead of 120: & 5 for the first number in stead of 50, and let 44 remain still in the middest, for the secõd number, after this sort as followeth, and thẽ worke by the rule as before.

Crownes.	*Yardes.*	*Crownes.*	
5.	44.	12.	
	12.		
	88.	3	
	44.	~~528~~	(105 $\frac{3}{55}$
	528.	~~555~~	

You must multiply 44 by 12 and therof commeth 528: diuide the same 528 by 5, and you shall find in your quotient 105 $\frac{3}{5}$. and euen so many

yards

yardes ſhould you haue found, if you had wrought the rule of thrée, by the firſt numbers propoſed. There is yet certaine other varieties, in working by the rule of thrée, but for that they require the knowledge of fractions, & becauſe they are not ſo eaſie as this firſt way, which is common, therfore content your ſelues with this ſame, vntil you haue learned the fractions, yͤ which by gods helpe I intend to ſet forth in the ſecond part of this booke, incontinently after that I haue firſt taught you the backer rule of thrée.

Of the backer rule of three.

The backer rule of thrée is ſo called, becauſe it requireth a contrary working to that, which the rule of thrée direct doth teach, whereof I haue now treated. For in the direct Rule of thrée, yͤ greater the third number is, ſo much the greater wil the fourth be. But here in this backer rule, it is cō-trariwiſe, for the greater the 3 num-

ber is, so much lesser will the fourth be. Then, whereas in the rule of thrée direct, the third number is multiplied by the second, and the product thereof diuided by the first : here you must multiply the second number by the first, and diuide the product of ẏ same by the third, and the number which commeth in the quotient, answereth to the question. For such practise cõmeth often times in vse: In such sort that if you should worke the same by the rule of thrée direct, and not to haue a regard vnto the Proposition of the question, you should then commit an euident and open error.

Example.

If 15 shillings worth of Wine, will serue for the ordinary of 46 men, when the Tunne of Wine is worth 12 pounds: for how many men will the same 15 shillings worth of wine suffice, when the Tunne of wine is worth but 8 poundes? It is cer-

taine

taine, that the lower the price is, that the Tunne of wine doth coſt, and ſo many more perſons will the ſaid 15 ſhillings in wine ſuffice. Therefore ſet downe your numbers thus: if 12 pounds ſuffice 46 men, for how many men will 8 pounds ſuffice? you muſt multiply 46 by 12, and thereof commeth 552, the which 552 you ſhal diuide by 8, and thereof commeth 69, and vnto 69 men, will the ſayd 15 ſhillings worth in wine ſuffice, when the Tunne of wine is worth but 8 pounds, as hereafter doth appeare by practiſe.

Lib.	*Men.*	*Lib.*
12.	46.	8.
	12.	7
	92.	~~552~~ (69
	46.	88
	552.	

2. Likewiſe a meſſenger maketh a iourney in 24 daies, when the day is but 12 houres long: in how many

daies

daies shal he make the same iourney, when the day is 16 houres in length? Here you must perceiue, that ẏ more houres there are in a day, the fewer daies will the messenger bée in going his iourney. Therefore write downe your numbers thus, as here you may sée.

Howers.	Dayes.	Howers.	
12.	24.	16.	4
	12.		12
	48.		288
	24.		166
	288.		1(18

And then multiply 24 dayes by 12 houres, and therof commeth 288: diuide the same 288, by the third number 16, & you shal find 18, the which is 18 dayes, & in so many daies will the Messenger make his Iourney, when the day is 16 houres long.

Likewise, when the bushell of wheat doth cost 3 shillings, the penny lofe of bread weigheth 4 lib.

I demaund what the same penny lofe shall way, when the bushell of wheate is worth but 2 shillings: here is to be considered, that the better cheape the wheat is, the heavier shal the penny loafe way, and therefore write down your 3 numbers, thus.

Shil.	Lib.	Shil.	
3.	4.	2.	
	3.		12 . Lib.
	12.		2 (6.

Then multiply 4 lib. which is the second nüber, by the first number 3, and they make 12, the which 12 you shall divide by the third number 2, & therof commeth 6 li. & so much must the peny lofe of bread way, when the bushell of wheat is worth but 2 shillings as may appeare. And now according to my former promise, shall follow the secōd part of Arithmetike, which teacheth the working by Fractions.

Here endeth the first part of *Arithmeticke*.

The ſecond part of *Arithmeticke, which treateth* of Fractions or broken numbers.

Chap. 1.

Of Fractions or broken numbers, & *the difference thereof.*

A Fraction or a brokē number, is as much as a part or many parts of 1, whereof there are two numbers with a line between thē both, that is to ſay, the one which is aboue the line, is called the numerator, the other vnderneath the line, is called the denominator, as by example, 3 quarters is called a fraction, which muſt be ſet downe thus $\frac{3}{4}$, wherof 3 which is the higher nūber aboue yͤ line is called the numerator, & 4 which is vnder yͤ line, is called yͤ denominator. And it is allways cōuenient yͤ the numerator be leſſe in nūber thā the denominator. For if yͤ nume-

rator, & the denominator be equal nūbers, then shal they represent a whole nūber thus as $\frac{1}{1}$, $\frac{2}{2}$, $\frac{3}{3}$. which are whole numbers: by reason that the numerators of these, and all such like, may be diuided by their denominators, & their quotients will alwaies bée but 1. But in case that the numerator of any fraction do excéed his denominator, then it is more than one whole: as $\frac{29}{18}$, is more than a whole number by $\frac{11}{18}$. And this is commonly called an improper fraction: other definition doth not herevnto appertaine. Furthermore it is to be vnderstoode, that when the numerator is iust the halfe of the denominator, then the same broken number is the iust halfe of 1 whole, as $\frac{6}{12}$, $\frac{7}{14}$, $\frac{8}{16}$, $\frac{9}{18}$, & other like, are the halfes of one whole number whether it be of mony, of measure, of waight, or any other thing: whereof doth grow & come forth 2 progressions naturall: the one progreding by augmenting or increasing, as these.

$\frac{1}{2}$, $\frac{2}{3}$, $\frac{3}{4}$, $\frac{4}{5}$, $\frac{5}{6}$, $\frac{6}{7}$, $\frac{7}{8}$, $\frac{8}{9}$, $\frac{9}{10}$. &c.

And they do procéed infinitely and will neuer reach to make a whole number, thus $\frac{1}{1}$. And the other progression, doth progredy by diminishing or decreasing, as thus.

$\frac{1}{2}, \frac{1}{3}, \frac{1}{4}, \frac{1}{5}, \frac{1}{6}, \frac{1}{7}, \frac{1}{8}, \frac{1}{9}, \frac{1}{10}$. &c.

And these doe procéed infinitely, & shall neuer come to make a o. which signifieth nothing, but shall euer retaine some certaine value of an vnity whereby it doth appeare that Fractions, or broken numbers are infinite.

Chap. 2.

Of the reducing or bringing together of 2 Fractions, or many of *diuers denominations, vnto Fractions* of one like denomination.

REduction, is as much as to reduce & bring together, or to put 2 or many numbers, being of diuers denominations the one from the other, into fractions of one denomination,

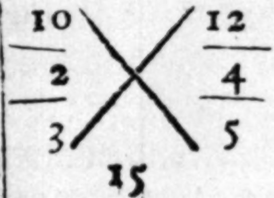
in reducing them unto a common denominator, and the reason hereof is, For because the diuersitie and difference of the broken numbers do come of ẏ denominators part, or of diuers denominators, and for the understãding hereof, there is a generall rule whose operation or working is thus. Multiply the denominators of the fractions, the one by the other, and so you shall haue a new denominator cõmon to all the fractions, the which denominator you must diuide by the particular denominators of euery of the said fractions, and multiply euery quotient by his owne numerator, & so you shall haue new numerators, for the numbers which you should reduce, as appeareth by this example following.

Reduction in common denomination.

Reduction. 1.

1 If you will reduce $\frac{2}{3}$ and $\frac{4}{5}$ together, first make a crosse betwéen the 2 fractions as here you sée, & then you

you must multiply yͤ two denominators the one by the other, yͭ is to say, 3 by 5 maketh 15, which is your common denominator, set that vnder the crosse, then diuide 15 by the denominator 3, and you shall haue 5, which



multiply by the numerator 2, & you shall find 10, set that ouer the $\frac{2}{3}$ and they are $\frac{10}{15}$, for the $\frac{2}{3}$. Afterwards diuide 15 by the denominator 5, and thereof commeth 3, the which multiply by the numerator 4, and you shall find 12, which set ouer the head of the $\frac{4}{5}$ and they make $\frac{12}{15}$ for the $\frac{4}{5}$: as appeareth more plainer aboue in the margent.

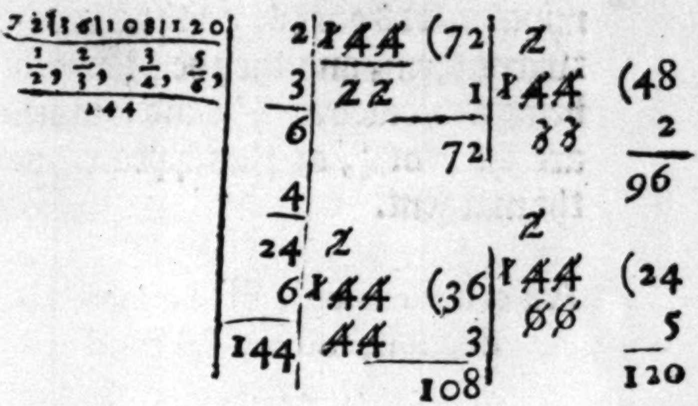
Reduction. 2.

2. If you will reduce $\frac{1}{2}$, $\frac{2}{3}$, $\frac{3}{4}$, $\frac{5}{6}$, together, you must multiply all the denominators the one by the other, that is to say, 2 by 3 maketh 6: then 6 by 4 amounteth to 24. Last of all 24 by 6, and thereof commeth 144, for the cōmō denominator. Thē, for yͤ first fraction

ction which is $\frac{1}{2}$ diuide 144 by the denominator 2, and therof cōmeth 72, the which multiply by the numerator 1, & it is still 72, set that ouer ẏ $\frac{1}{2}$ and that is $\frac{72}{144}$, for the $\frac{1}{2}$: Thē diuide 144 by the second denominator 3, & thereof cōmeth 48: the which multiply by the second numerator 2, and they are 96, which set ouer the $\frac{2}{3}$, and they make $\frac{96}{144}$, for the $\frac{2}{3}$: Then diuide 144 by the third denominator 4, and therof commeth 36, the which multiply by the third numerator 3, and they make 108, which set ouer the $\frac{3}{4}$, and they are $\frac{108}{144}$ for the $\frac{3}{4}$.

Finally diuide 144 by the last denominator 6, and therof cōmeth 24: The which multiply by the last numerator 5, and therof commeth 120, which set ouer the $\frac{5}{6}$, and they are $\frac{120}{144}$, for the $\frac{5}{6}$, as appeareth here by practise.

The example followeth in the next page.



Reduction of broken numbers of broken.

Reduction 3.

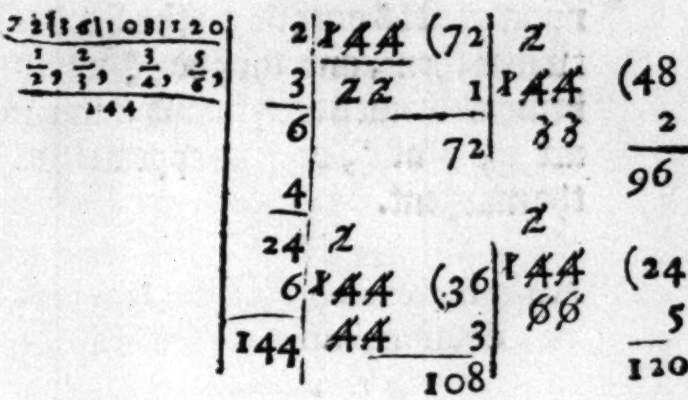
If you will reduce ẏ broken of broken together, as thus, the $\frac{2}{3}$ of $\frac{1}{4}$, of $\frac{4}{5}$, you must multiply all the numerators, the one by the other to make one broken number of the thrée broken numbers: that is to say, 2 by 1, maketh 2: and then 2 by 4, maketh 8, which 8 is your numerator. Then multiplie the Denominators the one by the other, that is to say, 3 by 4, maketh 12, and then 12 by 5, maketh 60, for your denominator,

$$\begin{array}{c} 8 \\ \hline 2, 1, 4, \\ \hline 3\ 4\ 5 \\ \hline 60. \end{array}$$

ction which is $\frac{1}{2}$ diuide 144 by the denominator 2, and therof cōmeth 72, the which multiply by the numerator 1, & it is still 72, set that ouer ẏ $\frac{1}{2}$ and that is $\frac{72}{144}$, for the $\frac{1}{2}$: Thē diuide 144 by the second denominator 3, & thereof cōmeth 48: the which multiply by the second numerator 2, and they are 96, which set ouer the $\frac{2}{3}$, and they make $\frac{96}{144}$, for the $\frac{2}{3}$: Then diuide 144 by the third denominator 4, and therof commeth 36, the which multiply by the third numerator 3, and they make 108, which set ouer the $\frac{3}{4}$, and they are $\frac{108}{144}$ for the $\frac{3}{4}$.

Finally diuide 144 by the last denominator 6, and therof cōmeth 24: The which multiply by the last numerator 5, and therof commeth 120, which set ouer the $\frac{5}{6}$, and they are $\frac{120}{144}$, for the $\frac{5}{6}$, as appeareth here by practise.

The example followeth in the next page.



Reduction of broken numbers of broken.

Reduction 3.

IF you will reduce ẏ broken of broken together, as thus, the $\frac{2}{3}$ of $\frac{1}{4}$, of $\frac{4}{5}$, you must multiply all the numerators, the one by the other to make one broken number of the three broken nūbers: that is to say, 2 by 1, maketh 2: and then 2 by 4, maketh 8, which 8 is your numerator. Then multiplie the Denominators the one by the other, that is to say, 3 by 4, maketh 12, and then 12 by 5, maketh 60, for your denominator,

8
2, 1, 4,
3 4 5
60.

minator, set 8 ouer 60, with a line betweene them, and they be $\frac{8}{60}$ which being abbreuied are $\frac{2}{15}$, and so much are the $\frac{2}{3}$ of $\frac{1}{4}$, of $\frac{4}{5}$ as appeareth in the margent.

An other example of the same reduction, and of the second *reduction.*

Reducti-on. 4.

If you will reduce $\frac{2}{3}$ of $\frac{1}{4}$, of $\frac{4}{5}$, the $\frac{3}{4}$ of $\frac{5}{7}$: And the $\frac{1}{2}$, of the $\frac{1}{2}$, of the $\frac{2}{3}$ of $\frac{1}{3}$. First it behoueth you of euery party of the broken numbers, to make of each of them one broken: as by the third Reduction is taught: that is to say, in multiplying ye numerators by numerators, & denominators by denominators: First for the first part which is $\frac{2}{3}$ of $\frac{1}{4}$, of $\frac{4}{5}$, you must as is before said, multiply 2 by 1, and then by 4, and you shall haue 8 for the numerator, likewise multiply 3 by 4, & the product by 5, and you shall haue 60 for the denominator: so they make $\frac{8}{60}$ which being abbreuied are $\frac{2}{15}$ for ye

first

first part, that is to say, for the $\frac{2}{3}$ of $\frac{1}{4}$ of $\frac{4}{5}$: secondly for the $\frac{3}{4}$ of $\frac{5}{7}$ multiply likewise the numerator 3 by 5, maketh 15, for the numerator. And multiply 4 by 7, maketh 28, for the denominator. And then they be $\frac{15}{28}$ for the second part: that is to say, for the $\frac{3}{4}$ of $\frac{5}{7}$. Thirdly for the $\frac{1}{2}$ of $\frac{1}{2}$, of $\frac{2}{3}$, of $\frac{1}{3}$, you must multiply ye numerators the one by the other, that is to say, 1 by 1, and then by 2, and last by 1, and all maketh but 2, for the numerator: likewise multiply the denominators 2 by 2, maketh 4, and 4 by 3 maketh 12, and then 12 by 3 maketh 36, for the denominator: and they are $\frac{2}{36}$, which being abbreuiated maketh $\frac{1}{18}$ for the third part, that is to say, for $\frac{1}{2}$ of the $\frac{1}{2}$ of $\frac{2}{3}$ of $\frac{1}{3}$. Last of all take the $\frac{2}{15}$, the $\frac{15}{28}$, and the $\frac{1}{18}$ and reduce them according to the order of the second reduction, and you shall find $\frac{1008}{7560}$ for the $\frac{2}{15}$. And $\frac{4050}{7560}$ for the $\frac{15}{28}$. And $\frac{420}{7560}$ for the $\frac{1}{18}$: and thus are broken numbers of broken reduced, as appeareth by practise.

2

$\frac{2}{3}, \frac{1}{4}, \frac{4}{5}$

60

2	3	2
$\frac{1}{2}$	$\frac{4}{12}$	$\frac{8}{60}$
$\frac{4}{8}$	$\frac{5}{60}$	15

15

$\frac{3}{4}, \frac{5}{7}$

28

2

$\frac{1}{3}, \frac{1}{2}, \frac{2}{3}, \frac{1}{3}$

36

1	2	1
$\frac{1}{1}$	$\frac{2}{4}$	$\frac{2}{36}$
$\frac{2}{2}$	$\frac{3}{12}$	18
$\frac{1}{2}$	$\frac{3}{36}$	

1008 4050 420

$\frac{2}{15}, \frac{15}{28}, \frac{1}{18}$

7560

15
28
120
30
420
18
3360
420
7560

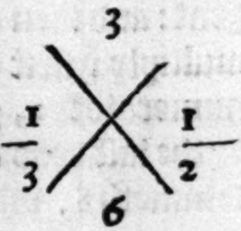
~~2~~ ~~0~~ ~~2~~
~~7~~ ~~5~~ ~~6~~ ~~0~~ (504
~~1~~ ~~5~~ ~~5~~ ~~5~~ 2
~~1~~ ~~1~~ 1008

~~1~~ ~~8~~
~~3~~ ~~0~~ ~~0~~
~~7~~ ~~5~~ ~~6~~ ~~0~~ (270
~~2~~ ~~8~~ ~~8~~ ~~8~~ 15
~~2~~ ~~2~~ 1350
270
4050

~~1~~
~~3~~ ~~3~~ ~~0~~
~~7~~ ~~5~~ ~~6~~ ~~0~~ (420
~~1~~ ~~8~~ ~~8~~ ~~8~~ 1
~~1~~ ~~1~~ 420

Reduction of broken numbers, and *the parts of broken together.*

IF you will reduce $\frac{1}{3}$, and the $\frac{1}{2}$ of $\frac{1}{3}$ together, to bring them into one broken number, you must first set downe the $\frac{1}{3}$ and $\frac{1}{2}$ as appeareth in the margent with a crosse betweene them, and then multiply the two denominators, the one by the other, that is to say, 2 by 3 maketh 6, set that vnder the crosse, thē multiply yͤ first numerator 1, by the last denominator 2, & yͭ maketh 2, vnto the which adde the last numerator 1, & they be 3, which set aboue your crosse, so you shall find that the $\frac{1}{3}$ and the $\frac{1}{2}$ of $\frac{1}{3}$, doe make $\frac{3}{6}$: which being abbreuied doth make $\frac{1}{2}$, which is as much as the $\frac{1}{3}$ and the $\frac{1}{2}$ of $\frac{1}{3}$, being reduced into one fraction. *Reduction. 5.*



Likewise if you will reduce the $\frac{2}{3}$ and the $\frac{1}{4}$ of $\frac{1}{3}$, you must doe as before, set downe the $\frac{2}{3}$ and $\frac{1}{4}$, with a crosse betweene

betwéen them, then multiply the two denominators the one by the other, ẏ is to saye 3 by 4, maketh 12: which set vnder ẏ crosse, as you sée in the margent: and then multiply ẏ first numerator 2, by the last denominator 4, and thereof commeth 8, whereunto adde the last numerator 1, & that maketh 9: which 9 set ouer ẏ Crosse: so shall you find that the $\frac{2}{3}$ and the $\frac{1}{4}$ of $\frac{1}{3}$, are worth $\frac{9}{12}$, the which abbreuied doe make $\frac{3}{4}$, as appeareth by example in the margent.

Reduction of whole numbers and broken together into a Fraction, *the which fraction is called an improper Fraction.*

If you will reduce whole number & broken, into brokē, you shal reduce ẏ whole nūber into brokē, as by this example may appeare: if you will reduce 17 $\frac{5}{8}$, into a broken number, first you must multiply the whole nūber 17 by the denominator of the brokē, which is 8, in saying 8 times 17, doe make 136, unto the which you must adde the numerator of $\frac{5}{8}$ which is 5, and all amounteth to 141, which set ouer $\frac{5}{8}$, with a line betwéen them, and they wilbe $\frac{141}{8}$ so much is 17 $\frac{5}{8}$ worth in an improper fraction, as appeareth here by practise. *Redaction. 6.*

17	141	
8	17 $\frac{5}{8}$	maketh $\frac{141}{8}$
136		
5		
141		

In

In case you haue whole number & broken, to be reduced with brokē, you must bring the whole nūber into his broken, in multiplying it by the denominator of the broken number going therewith, and adde therunto the numerator of the said brokē number, as in the last example is declared, and then reduce that brokē number with the other broken, as héere appeareth by this example. Reduce 10 $\frac{2}{3}$ and $\frac{4}{7}$ together, first bring 10 $\frac{2}{3}$ all into thirds, as it is taught by the first reduction, and you shall find $\frac{32}{3}$, then reduce the $\frac{32}{3}$ and $\frac{4}{7}$ together, by the first reduction, and you shall find $\frac{224}{21}$ for the $\frac{32}{3}$: and $\frac{12}{21}$ for $\frac{4}{7}$ as appeareth here by practise.

$\frac{32}{10\frac{2}{3}}$ | $\frac{224}{\frac{32}{3}}$

$\frac{12.}{\frac{4}{7}}$ 32. 4.

7. 3.

21 224 12

Also in case you haue in both parts of

of your reduction, as well whole nũber as broken, you muſt alwaies put the whole of each part into his brokẽ, as by the 6 reduction is taught.

Example.

If you will reduce 12 $\frac{1}{4}$ with 14 $\frac{2}{3}$, to bring them into one denominatiõ, firſt bring the 12 $\frac{1}{4}$ all into fourths, & you ſhal find $\frac{49}{4}$: then likewiſe reduce 14 $\frac{2}{3}$, all into thirdes, and you ſhall haue $\frac{44}{3}$, for the 14 $\frac{2}{3}$: then reduce $\frac{49}{4}$ and $\frac{44}{3}$ together, by ẏ order of ẏ firſt reduction, and you ſhall find $\frac{147}{12}$ for the $\frac{49}{4}$. And $\frac{176}{12}$ for the $\frac{44}{3}$: as here by practiſe doth plainly appeare.

49	44	147	176
12 $\frac{1}{4}$	14 $\frac{2}{3}$	$\frac{49}{4}$	$\frac{44}{3}$

12

Chap. 3.

Of abbreuiation of one broken number into a lesser broken.

Abbreuiation is as much as to set downe, or to write a brokē nūber by figures of lesse significatiō & not diminishing ẏ value therof. The wt to do, there is a rule whose operatiō is thus, diuide ẏ numerator, & likewise the denominator, by one whole nūber, the greatest that you may find in the same brokē nūber, & of the quotient of ẏ numerator, make it the numerator, and likewise of ẏ of the denominator, make it your denominator, as by example.

1 If you will abbreuiate $\frac{54}{81}$, you shal vnderstand ẏ the greatest whole number that you may take, by the which you may diuide the numerator and the denominator is 27, which is the halfe of the denominator, & that is a whole number, for you cannot take a whole nūber out of the denomina-

tor

for 81, which will diuide both the numerator & denominator, but yͤ there will bee either more or lesse than a whole number, therfore if you diuide 54 by 27, you shall find in the quotient 2 for the numerator: likewise if you diuide 81 by 27 you shall haue in the quotient 3 for the denominator: then put 2 ouer the 3, with a lyne beetweene them, and you shall find $\frac{2}{3}$, and thus by this rule the $\frac{54}{81}$ are abbreuied vnto $\frac{2}{3}$: as appeareth in the margent, and so is to bee vnderstood of all other.

$$\frac{54}{81}$$

~~10~~
~~54~~ (2
~~27~~

$$\frac{2}{3}$$

~~20~~
~~81~~ (3
~~27~~

The forme and manner how to finde the greater number, by the which you may wholy diuide the numerator and denominator, (to the end ye may abbreuiat them) is thus.

First diuide the denominator by his numerator, & if any number dos remaine, let your diuisor be diuided by the same number, & so you must cõtinue vntill you haue so often times diuided, that there may nothing remain, then it is to be understood, that your last diuisor (wherat you did end and that o did remain after your last diuision) is the greatest number, by ỳ which you must abreuiat, as you did in the last exãple But in case ỳ your last diuisor be 1, it is a token that the same nũber cannot be abreuied to any lower fractiõ than you find it at ỳ first. *Ex.* of $\frac{54}{81}$: diuide 81, which is the denominator by 54 which is his numerator, and there resteth 27, thẽ diuide 54 by 27, and there remaineth a 0, which is nothing, wherfore your last

last diuisor 27 is the number by the which you must abreuiat $\frac{54}{81}$: as in the last example is specified.

Another manner of Abbreuiation.

2. Mediate the numerator and also the denominator of your Fraction in case the numbers be euen, that is to say, take allwais of the halfe of the numerator and likewise of the denominator and of the mediation or halfe of ỹ numerator, make it your numerator also of halfe ỹ denominator make your denominator, & so cōtinue as often as you can in taking allwaies the halfe of ỹ numerator, & likewise of ỹ denominator: or els see if you may abbreuiat the nūbers which doe remaine, by 3, by 4. by 5, 6, 7, 8, 9, or by 10: for you must abreuiat thē as often as you can by any of the said numbers. And it is to bee noted, that with whatsoeuer nūber of these, you doe abbreuiat the numerator of your fraction, by the same you must abbreuiate

uiate likewise the denominator, so continuing vntil they can no more be abbreuied. And it is to be vnderstood, that if the Numerator & the Denominator be euen nūbers, as you may know when the first figure is an euē number, or a 0, thē you may perceaue if both the numerator and the denominator may be abbreuied by 10, by 8 by 4, or by 2 : albeit that sometimes they may be abbreuied by 3. And if they be odde numbers, thē must you cōsider if they may be abbreuied by 9, by 7, by 5, or by 3: but when the first number, aswell of the numerator, as of the denominator are euen nūbers, then may you well know that such numbers may be abbreuied by 2, as is aforesaid. And if you adde the figures of ẏ numerator together, in such mā-ner as you doe in making the proofe by 9 in whole nūbers: that is, if you find 9: it appeareth that you may abbreuy that number by 9. And likewise by 3, and sometimes by 6, if you find 6 it may be abbreuied by 6, and

alwaies by 3 if you find 3, it is a signe that you abbreuiate by 3, & by what soeuer nũber that you do abbreuiate the numerator, by the same must you abreuiate likewise the denominator: and if the first figures of the same nũber be 5, or 0 you may abbreuiate thẽ by 5, but if the first figures be both 0, they may be abbreuied by 10: in cutting away the two ciphers thus, as $\frac{2}{3}|\frac{0}{0}$ which maketh $\frac{2}{3}$, and sometimes by 100, thus, as $\frac{1}{2}|\frac{00}{00}$, in cutting away the foure ciphers after this sort, $\frac{1}{2}|\frac{00}{00}$ and then the $\frac{100}{200}$ do make $\frac{1}{2}$, and after this manner haue I set here diuers examples: although that all broken numbers cannot be abbreuied by this rule, yet all fractions may be well abbreuied by the first rule aforesaid.

Abbreuied.

$\frac{3840}{7680}$ by 10.		$\frac{1890}{4725}$ by 9.	
$\frac{384}{768}$ by 8.		$\frac{210}{525}$ by 7.	
$\frac{48}{96}$ by 6.		$\frac{30}{75}$ by 5.	
$\frac{8}{16}$ by 4.		$\frac{6}{15}$ by 3.	
$\frac{2}{4}$ by 2.		$\frac{2}{5}$	
$\frac{1}{2}$			

3. Furthermore you ſhall vnderſtand that ſometimes it happeneth, that all the figures of the numerator are equall vnto them of the denominator, which when it ſo happeneth, you may then take one of them of the numerator, & alſo one of them of the denominator, and it ſhall be abreuied as $\frac{555}{888}$, being abreuied after this mãner cõmeth to $\frac{5}{8}$. And yet it happeneth ſometimes, that 2 or many figures of the numerator are proportioned vnto 2, or many figures of their denominators, & that the other figures of the ſame number are the figures

ons

one to the other in this proportiõ following. Then may you take two or more figures, aswell of yͤ numerator, as of the denominator, & by this manner the ſame number ſhalbe abbreuied, as $\frac{4747}{5959}$ bæing abbreuied by this rule, doe come to $\frac{47}{59}$.

4 Alſo it happeneth ſometimes, yͭ you would abreuiate one number vnto the ſemblance or likeneſſe of an other: And for to know if the ſame may bæ abreuied, and alſo by what number it may be abreuied you muſt diuide the numerator of the one nũber by the numerator of the other: & likewiſe the denominator of the one, by the denominator of yͤ other, for in caſe that after euery diuiſion there do remaine 0 and that the two quotiẽts be equal, then is one of them the nũber by the which the ſaid fractiõ muſt be abreuied, as by example of $\frac{115}{207}$. I would know if they may bæ abreuied vnto $\frac{5}{9}$, and for to doe this, you muſt diuide 115 by 5, and you muſt diuide 207 by 9, and there will

come into both the quotients 23: by the which it appeareth that this number may be abbreuied by 23.

$$\frac{115}{207} \qquad \frac{5}{9} \qquad \begin{array}{r} \cancel{1}\cancel{0} \\ \cancel{1}\cancel{1}\cancel{5} \\ \cancel{5}\cancel{5}\,(23 \end{array} \qquad \begin{array}{r} \cancel{2}\cancel{0} \\ \cancel{2}\cancel{0}\cancel{7} \\ \cancel{9}\cancel{9}\,(23 \end{array}$$

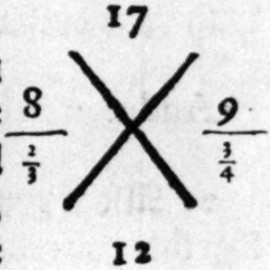
Chap. 4.

Of the adding of two or many brokē *numbers together, as by example.*

For to adde Fractions or brokē numbers togither, there is a generall Rule, which is thus. If the nūbers be of vnlike denominations the one to the other, you must reduce thē into a common denomination by the doctrine of the first reduction: & when you haue reduced them, you must thē adde both the numerators together, and set the product of the said addition ouer the crosse, & diuide the same Numerator by the common denominator

nator, as by this example followwing.

1. If you will adde $\frac{2}{3}$ with $\frac{3}{4}$, you must first reduce the two fractions both into one denominatiõ, according to the order of the first reduction, that is to say, in multiplying the denominator of the first fraction which is 3, by the denominator of the other fraction which is 4, and they make 12 for your common denominator: the which 12 you shall set vnder the crosse, then multiply the first numerator 2 by the last denominator 4: and thereof commeth 8, which set ouer the $\frac{2}{3}$, and



5
$\cancel{1}2$
$\cancel{1}\cancel{7}$ $(1\frac{5}{12}$

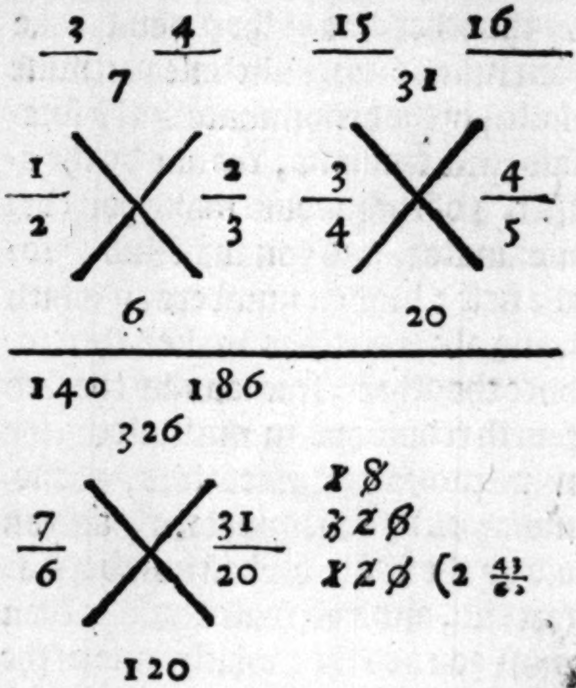
then multiply ye last numerator 3, by the first denominator 3, and thereof commeth 9, which you must set ouer the $\frac{3}{4}$: thẽ adde the numerator 8, with the numerator 9, and they make 17, which set ouer the crosse, & then your fraction

fraction will be $\frac{17}{12}$: which is the addi-
tion of the $\frac{2}{3}$ with $\frac{3}{4}$. And because the
numerator 17, is greater thã his de-
nominator 12, therfore you must di-
uide 17 by 12, and thereof will come
1, & 5 remaining, which 5 you must
set apart, and 12 vnder the same with
a line betwæne them, and they are
worth $\frac{5}{12}$, and so much are yͤ $\frac{2}{3}$ added
with $\frac{3}{4}$, as doth appeare.

Addition in broken numbers.

2. Also if you will adde $\frac{1}{2}$, $\frac{2}{3}$, $\frac{3}{4}$ & $\frac{4}{5}$
together you must first add the $\frac{1}{2}$ & $\frac{2}{3}$
together, according to yͤ doctrine of yͤ
last rule, & you shall find $\frac{7}{6}$: then add
$\frac{3}{4}$ and $\frac{4}{5}$ together by the said last rule,
and they make $\frac{31}{20}$. Then finally adde
yͤ $\frac{7}{6}$ (which came of the $\frac{1}{2}$ and $\frac{2}{3}$ added
together) with $\frac{31}{20}$, which came of the
$\frac{3}{4}$ and $\frac{4}{5}$ added together, and you shall
find by the aforesaid addition that
they amount vnto $\frac{326}{120}$. Wherfore di-
uide 326 by 120 and thereof cõmeth
2 and 86 remaineth which is $\frac{86}{120}$ of
one

one whole, and they being abbreuied do make $\frac{43}{60}$ and thus the $\frac{1}{2}$, $\frac{2}{3}$, $\frac{3}{4}$, and $\frac{4}{5}$ being added together do amount to 2 and $\frac{43}{60}$, as here vnder doth appeare.



Addition of broken number of broken.

3. Furthermore, if you will adde the broken numbers of broken together as

as to adde ẏ $\frac{2}{3}$ of $\frac{3}{4}$ of $\frac{4}{7}$ wͭ the $\frac{5}{6}$ of $\frac{1}{2}$ of $\frac{5}{8}$: first you must reduce the numbers according to the order of the fourth reduction, in multiplying the numerators of the first 3 fractions, the one by the other, and of the product make your numerator, & likewise you must multiply the denominators of ẏ foresaid three fractions, the one by the other, & of the product make your denominator, and you shall find $\frac{24}{60}$ for the first 3 broken numbers, ẏ which being abbreuied doe make $\frac{2}{5}$ then reduce the other 3 fractions, by the said fourth reduction, in multiplying the numerators by numerators, & denominators by denominators, as you did by the first 3 broken numbers aforesaid, and you shall find $\frac{25}{96}$, then must you add the $\frac{2}{5}$ which came of the first 3 broken numbers, & $\frac{25}{96}$ which are come of the last 3 fractions, both together, by the instructiō of the first addition: & you shall find $\frac{317}{480}$: which cannot bee abbreuied, but is the iust product of the addition: so much are $\frac{2}{3}$ of

of $\frac{3}{4}$ of $\frac{4}{5}$ added with the $\frac{5}{6}$ of $\frac{1}{2}$ of $\frac{5}{8}$ as hereafter by practise doth euidently appeare.

$$\frac{24}{\frac{2}{3},\ \frac{3}{4},\ \frac{4}{5}} \quad \frac{}{60} \qquad \frac{2}{5} \qquad \frac{35}{\frac{5}{6},\ \frac{1}{2},\ \frac{5}{8}} \quad \frac{}{96}$$

317

192 125

$$\frac{2}{5} \times \frac{25}{96} \qquad \frac{317}{480}$$

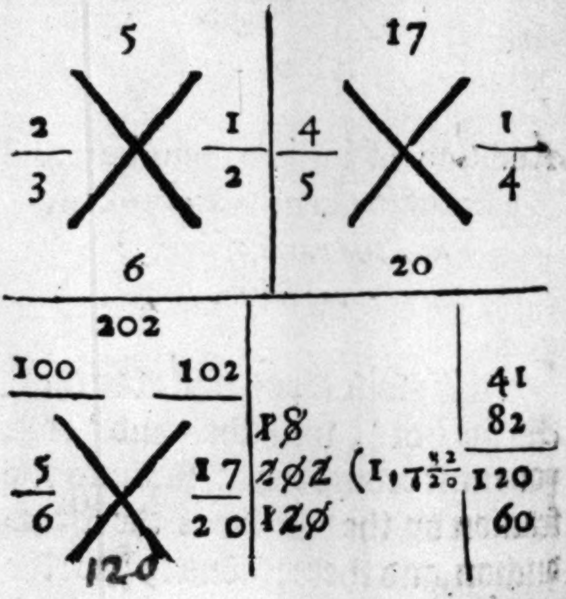
480

Addition of broken number and parts of broken, with broken, *and the parts of broken together.*

4. Likewise if you will adde the $\frac{2}{3}$, and the $\frac{1}{2}$ of $\frac{1}{3}$, with the $\frac{4}{5}$ and $\frac{1}{4}$ of $\frac{1}{5}$, you must reduce the $\frac{2}{3}\frac{1}{2}$ first into one fraction by the doctrine of the fift reduction, and thereof cōmeth $\frac{5}{6}$, for the

$\frac{2}{3}$ and

$\frac{2}{3}$ and $\frac{1}{2}$ of one of the said thirds: then reduce the $\frac{4}{5}$ and $\frac{1}{4}$ by the said fift reduction, and thereof commeth $\frac{17}{20}$. Last of all adde the $\frac{5}{6}$ and $\frac{17}{20}$ together according to the first rule of addition: and you shall find $\frac{202}{120}$, which being diuided bringeth 1, and $\frac{82}{120}$ part remaining, which abreuied maketh $\frac{41}{60}$, and thus you doe perceiue that the $\frac{2}{3}$ and $\frac{1}{2}$ of $\frac{1}{3}$, added with the $\frac{4}{5}$ & $\frac{1}{4}$ of $\frac{1}{5}$, do amount vnto $1\frac{41}{60}$, as hereafter by practise doth plainly appeare.



Addition of whole number & broken with whole number & broken.

5. Also if you will adde 12 $\frac{4}{5}$ with 20 $\frac{5}{6}$, you may, (you may if you will) adde 12 & 20 together, & they make 32, the which you shall set apart and then adde the two broken numbers together, that is to say $\frac{4}{5}$ and $\frac{5}{6}$ by the order of the first additiō, & they make $\frac{49}{30}$ therefore diuide 49 by 30, & thereof commeth 1 and $\frac{19}{30}$ parts remaine, which 1 you must adde vnto the 32, which were put apart, and the whole addition wilbe 33 $\frac{19}{30}$. Or otherwise, you may reduce 12 $\frac{4}{5}$ into the likenes of a Fraction by the order of the first reductiō, and they wilbe $\frac{64}{5}$ and likewise by the same reductiō, reduce 20 $\frac{5}{6}$ and they be $\frac{125}{6}$, then adde $\frac{64}{5}$ with the $\frac{125}{6}$, by the first addition, and you shal find $\frac{1009}{30}$. Therfore diuide 1009 by 30, and therof commeth 33 $\frac{19}{30}$ as before, and as by practise of the same both waies doth hereafter appeare.

12 $\frac{4}{5}$
20 $\frac{5}{6}$

12 $\frac{4}{5}$		49	1
20 $\frac{5}{6}$	$\frac{24}{5}$	$\frac{25}{6}$	~~49~~ (1 $\frac{19}{30}$
$\frac{1}{33 \frac{19}{30}}$		30	~~30~~

1009

$\frac{64}{5}$	$\frac{125}{6}$	$\frac{384}{64}$ / 5		$\frac{625}{125}$ / 6
12 $\frac{4}{5}$	20 $\frac{5}{6}$		30	

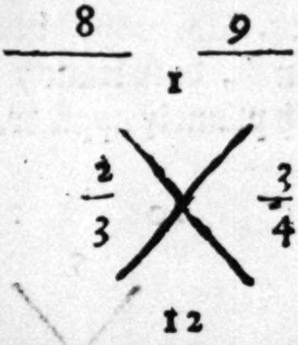
11
~~1009~~ (33 $\frac{19}{30}$
~~330~~

Chap. 5.

Of Subtraction in broken numbers.

1 If you wil subtract $\frac{2}{3}$ from $\frac{3}{4}$, you must first reduce both the fracti- ons into a common denominatiō, by the doctrine of the first reduction, and you

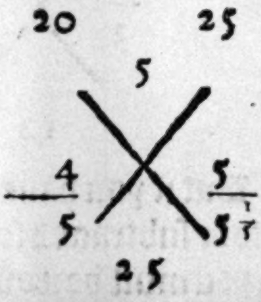
you ſhall find $\frac{8}{12}$ for the $\frac{2}{3}$, and $\frac{9}{12}$ for the $\frac{3}{4}$. Therfore abate the numerator 8 frō the numerator 9, and there will remaine 1, which 1 you muſt ſet ouer the croſſe, & the ſame is $\frac{1}{12}$, & ſo much is the reſt of that ſubtraction, as may appeare here by practiſe.



2. But if you haue a broken number to be ſubtracted from a whole nūber, you muſt borrow 1 vnitie of the whole number, and reſolue it into a fraction of like denomination, as is that fraction, which you would abate from the ſame whole number, and then abate the ſaid fraction therfrom, & you ſhall find what doth remaine, as by this exāple. If you abate $\frac{4}{5}$ from

8, you must borrow one of the said 8, and resolue it into fifts like vnto the fraction, because it is $\frac{4}{5}$, and that 1 will be 5 fifts thus $\frac{5}{5}$ therfore abate $\frac{4}{5}$ from $\frac{5}{5}$ and there will remaine $\frac{1}{5}$, and subtract the 1 which you borrowed from 8 and there doth remaine 7: and the $\frac{1}{5}$ also which remained after the said $\frac{4}{5}$ were abated. Thus the $\frac{4}{5}$ being subtracted from 8, doth leaue 7 $\frac{1}{5}$ as by practise doth plainely appeare.

$$\begin{array}{r} 8 \\ 1 \\ \hline 7\frac{1}{5} \end{array}$$



Or otherwise you shall put 1 vnder 8 with a line betweene, & that will be $\frac{8}{1}$: then set downe the $\frac{4}{5}$ and the $\frac{8}{1}$ with a crosse betweene them, then you must reduce them into one denomination by the first reduction, and you shall find 4 ouer the $\frac{4}{5}$, and 40 ouer the $\frac{8}{1}$, then

then subtract the said 4 from 40, and there will remaine 36, the which you shall set ouer the crosse, and they doe make $\frac{36}{5}$. Likewise you must multiply the denominator 5 by 1 maketh 5, set that vnder the crosse, then diuide 36 by 5, and thereof will come 7 $\frac{1}{5}$, as before, for the rest of that subtraction, as here by practise appeareth.

4 40

36

$\frac{4}{5}$ $\frac{8}{1}$

5

$\frac{8}{4}$ — 8 (1 — 4

$\frac{8}{8}$ — 8 (5 — 40 — 4 — 36

1
36 (7 $\frac{1}{5}$
5

3 If you will subtract broken number from whole number and broken: as if you would subtract $\frac{3}{4}$ from 6 $\frac{5}{6}$, you may by the first subtraction, abate $\frac{3}{4}$ from $\frac{5}{6}$, and there will remain $\frac{1}{12}$, & the 6 doth stil remain whole, because the $\frac{3}{4}$ may well be abated from the $\frac{5}{6}$,

and thus $\frac{3}{4}$ being abated from 6 $\frac{5}{6}$ leaueth 6 $\frac{1}{12}$, as appeareth by practise.

$$\begin{array}{ll} 6 & \frac{5}{6} \\ 9 & \frac{3}{4} \\ \hline 6 & \frac{1}{12} \end{array}$$

18 20

2

$\frac{3}{4}$ $\frac{5}{6}$ $\frac{1}{12}$

24

Likewise if you will abate $\frac{2}{3}$ from 14 $\frac{2}{5}$, you must first reduce 14 $\frac{2}{5}$ all into fifts by the 6 reduction, and they be $\frac{72}{5}$ then reduce $\frac{2}{3}$ and $\frac{72}{5}$ into a cōmon denomination, by the first reduction, and you shall find $\frac{10}{15}$ for the $\frac{2}{3}$ and $\frac{216}{15}$ for ẏ $\frac{72}{5}$: thē subtract the numerator 10 of the first fraction, from 216 of the second fraction, & there remaineth $\frac{206}{15}$. Therefore diuide 206, by 15, and thereof commeth 13 $\frac{11}{15}$, & so much remaines of this subtraction, as may appeare in the next page following.

$$\frac{10}{\quad}\qquad\frac{216}{\quad}$$

$$\frac{72}{\quad}\qquad 206$$

$$14\ \tfrac{3}{5}$$

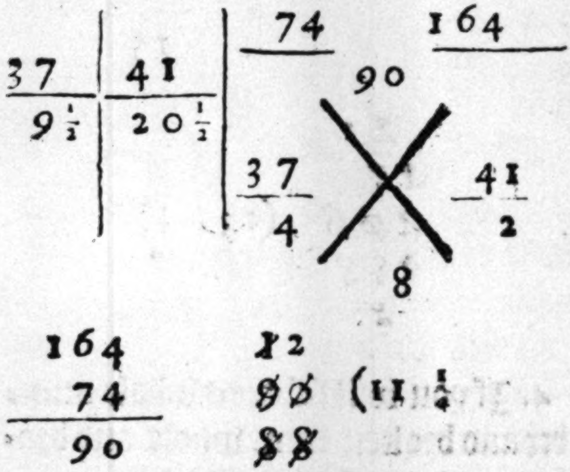
$$\frac{2}{3}\qquad\frac{72}{5}$$

$$15$$

$$\cancel{2}1$$
$$\cancel{1}\cancel{8}$$
$$\cancel{2}\cancel{0}\cancel{6}\ (13\ \tfrac{11}{15}$$
$$\cancel{1}\cancel{8}\cancel{8}$$
$$\cancel{1}$$

4. If you will ſubtract whole number and broken from whole and broken, as thus, if you will ſubtract 9 $\frac{1}{4}$, from 20 $\frac{1}{2}$, you muſt reduce 9 $\frac{1}{4}$ into fourths, and likewiſe the 20 $\frac{1}{2}$ into halfes, by the firſt reduction: and you ſhall find $\frac{37}{4}$ for the 9 $\frac{1}{4}$: and $\frac{41}{2}$ for the 20 $\frac{1}{2}$. Then reduce $\frac{37}{4}$, and $\frac{41}{2}$ into one denomination, according vnto the firſt reduction, and you ſhall find $\frac{74}{8}$ for the $\frac{37}{4}$, and $\frac{164}{8}$ for the $\frac{41}{2}$ then abate the numerator of $\frac{74}{8}$ which

which is 74 from 164, which is the numerator of $\frac{164}{8}$, and there remaineth $\frac{90}{8}$, then diuide 90 by 8, & thereof cometh 11 $\frac{1}{4}$, which is the remaine of this subtraction.



Subtraction of broken numbers of *broken from fractions of fractions.*

5. If you will substract the $\frac{1}{2}$ of $\frac{2}{3}$ of $\frac{3}{5}$, from the $\frac{5}{6}$ of $\frac{3}{4}$ of $\frac{7}{8}$, you must first bring the $\frac{1}{2}$ of $\frac{2}{3}$ of $\frac{3}{5}$ into one fraction, by the 3 reduction: and the $\frac{5}{6}$ of $\frac{3}{4}$ of $\frac{7}{8}$, likewise into one fractiō by the same Reduction, and you shall find $\frac{6}{30}$ for the

the first 3 broken numbers, which being abbreuied do make $\frac{1}{5}$; and for the other 3 broken numbers, you shall find $\frac{105}{192}$: which being likewise abbreuied doe make $\frac{35}{64}$, then you shall subtract $\frac{1}{5}$ from $\frac{35}{64}$ by the instruction of the first Subtraction in reducing both the fractions into a common denomination, as before is done, and you shal find remaining $\frac{111}{320}$, as may appeare by example.

6		105
$\frac{1}{2}$ $\frac{2}{3}$ $\frac{3}{5}$	$\frac{1}{5}$	$\frac{5}{6}$ $\frac{3}{4}$ $\frac{7}{8}$
30		192 $\frac{35}{64}$

64 175

111

$$\frac{1}{5} \qquad \frac{35}{64} \qquad \begin{array}{r} 175 \\ 64 \\ \hline 111 \end{array}$$

320

Chap. 6.

Of multiplication in broken nũbers.

First for to multiply in broken number, there is a rule which is thus, you must multiply the numerator of the one fraction, by the numerator of the other. And likewise you must multiply the denominator of the one by the denominator of the other. And then divide the fraction if it may be divided, or else abbreviate it, if it may be abbreviated, and it is done. But if there be whole number and broken together, you must reduce the whole numbers into their broken, & adde thereunto the numerator of his broken, and thẽ multiply as is before sayd, as also hereafter by examples shall more plainely appeare.

1. If you will multiply $\frac{2}{3}$ by $\frac{3}{4}$, you must multiply the numerator 2 by the numerator 3, and thereof commeth 6 for the numerator. Likewise you must multiply the denominators the one

by

by the other, that is to say, 3 by 4, and thereof commeth 12 for the denominator: so that the multiplication cōmeth to $\frac{6}{12}$, which being abbreuied do make $\frac{1}{2}$: and so much amounteth the multiplication of the $\frac{2}{3}$ by $\frac{3}{4}$, as by practise appeareth.

$$\frac{2}{3} \overset{6}{\underset{12}{\overline{\underline{\qquad\qquad}}}} \frac{3}{4} \qquad \frac{\overset{1}{6}}{\underset{2}{12}}$$

2 Likewise if you will multiply a broken number by whole number, or whole number by broken, which is al one as $\frac{4}{5}$ by 18, or els 18 by $\frac{4}{5}$, you must set 1 vnder 18, thus $\frac{18}{1}$: & then multiply the numerator 18, by yͤ numerator 4, and thereof commeth 72. Likewise multiply the denominator 5, by the denominator 1, and thereof commeth 5, then diuide 72 by the denominator 5. and thereof cōmeth 14 $\frac{2}{5}$: for yͤ whole multiplication. Or otherwise, abate frō 18 his $\frac{1}{5}$ part, which is 3 $\frac{3}{5}$, & there remaineth 14 $\frac{2}{5}$, as hereafter foloweth

$$\frac{72}{\frac{4}{5}\qquad\frac{18}{1}}\atop 5$$

2
7̸2 (14 $\frac{2}{5}$
5̸5̸

Or otherwise.

$$\frac{18}{\frac{18}{1}\qquad\frac{4}{5}}\atop 5$$

3
1̸8̸ (3 $\frac{3}{5}$
5̸

18
3 $\frac{3}{5}$
14 $\frac{2}{5}$

3. Also if you wil multiply a whole number, by whole number & broken, or else whole number and broken by a whole number, which is all one, as by exãple: if you will multiply 15 by 16 $\frac{3}{4}$, or else 16 $\frac{3}{4}$ by 15: First reduce 16 $\frac{3}{4}$ all into fourths, in multiplying 16 by the denominator of $\frac{3}{4}$ which is 4, and therof commeth 64, whereunto adde the numerator 3, and it maketh $\frac{67}{4}$: which multiply by $\frac{15}{1}$ according to the instruction of the last example, and you shall find the product of this multiplication to be 251 $\frac{1}{4}$, as by practise in the next page following doth appeare.

67	1005	67	2 1
$16\frac{3}{4}$	$\frac{67}{4}$ $\frac{15}{4}$	15	$\cancel{1}\cancel{0}\cancel{0}\cancel{5}(251$
	4	335	$\cancel{4}\cancel{4}\cancel{4}$
		67	$\frac{1}{4}$
		1005	

4. And if you will multiply a brokẽ number, by whole number & broken, or els whole nũber and broken by a broken. As by Example, if you will multiply $\frac{1}{4}$ by 18 $\frac{2}{3}$, or else 18 $\frac{2}{3}$ by $\frac{1}{4}$, which is all one: you must reduce the whole number into his broken by the first Reduction, and you shall find $\frac{56}{3}$, which you shall multiply by the $\frac{1}{4}$ after the doctrine of the first multiplication, that is to say: in multiplying the Numerator 56, by the Numerator of $\frac{1}{4}$, which is 1: and it is still 56, because 1 doth neither multiply nor divide. And likewise you must multiply the denominator 3, by the denominator 4, and it maketh 12: then divide 56 by 12, and thereof cõmeth 4 $\frac{2}{3}$. And so much amounteth the multiplication of the said 18 $\frac{2}{3}$ multi-

$\frac{2}{3}$ multiplyed by $\frac{1}{4}$, as by example.

	56	56	18
18	$\frac{2}{3}$	$\frac{56}{3}$ $\frac{1}{4}$	88 (4 $\frac{2}{3}$
		12	12

5. If you will multiply whole number and broken, with whole and broken, you must first put either whole number into his broken, according to the instruction of the first reduction, and then multiply the one numerator by the other, and of the product make your numerator. And likewise multiply the denominators the one by ye other, & thereof make the denominator, then divide the numerator by the denominator, and the quotient shall be the increase of this multiplication. Examp. If you would multiply 12 $\frac{4}{5}$ by 6 $\frac{3}{4}$: first by the first reduction the 12 $\frac{4}{5}$ will make $\frac{64}{5}$: and the 6 $\frac{3}{4}$ will make $\frac{27}{4}$, thē multiply ye numerator 64, by the numerator 27, and thereof commeth 1728 for ye numerator. And then you must multiply the denominator

nator

nator 5, by the denominator 4, & they do make 20: then diuide 1728, by 20, & thereof commeth 86 $\frac{2}{5}$, for the whole multiplication, as by example.

	1728	64	1
	$\frac{64}{12\ \frac{4}{5}}$ $\frac{27}{6\ \frac{3}{4}}$	27	$\cancel{1}\cancel{7}28$
		448	$2\cancel{0}\cancel{0}$ (86 $\frac{2}{5}$
		128	2
	20	172	

6. If you will multiply one broken number by many broken numbers, thus: As to multiply $\frac{2}{3}$ by $\frac{5}{7}$ and by $\frac{4}{9}$, you must multiply the numerators of all the fractions, the one by the other, & of the product make the numerator, that is to say, 2 by 5, & they be 10, then 10 by 4, & they be 40 for the Numerator. Likewise you must multiply the denominators ye one by the other, that is to say 3 by 7 maketh 21, then 21 by 9 maketh 189, for the denominator: then set 40 ouer ye 189 with a line betwéen them, and they make $\frac{40}{189}$. And so much amounteth the

the whole multiplicatiō of the $\frac{2}{3}$ multiplyed by $\frac{5}{7}$ and $\frac{4}{9}$ as by example following. And thus is to be vnderstod of all such like.

	2	3	
	5	7	
40	10	21	
$\frac{2}{3}$ $\frac{5}{7}$ 4	4	9	$\frac{40}{189}$
189	40	189	

Chap. 7.

Of Diuision in broken numbers.

Note that in diuisiō of broken numbers, you must set your Diuisor downe first, next vnto the left hand, and the diuidend or number which is to bee diuided alwaies toward the right hand. And then multiply crosse-wise, that is to say, the numerator of your diuisor, by the denominator of the diuidend: and the product shalbe the denominator, which afterward shall be your diuisor.

And

And likewise you must multiply the Denominator of your first number, that is to say, of your Diuisor, by the Numerator of the diuided, which afterward shall be the diuidend, and that must be set ouer the crosse, and the denominator vnder the crosse, thẽ diuide the numerator by the denominator if it may be diuided, if not, you must abreuiate them, as hereafter by examples shall more plainly appeare.

1. If you will diuide $\frac{3}{4}$ by $\frac{2}{3}$, you must set the diuisor (which is $\frac{2}{3}$) next to the left hand, and the diuidend $\frac{3}{4}$ toward you right hand, with a crosse betweene them: as may appeare by this exãple in the margent. Then you shall multiply the numerator of the $\frac{2}{3}$, which is 2 by the denominator of the $\frac{3}{4}$ which is 4 & thereof commeth 8 which shalbe your new diuisor: set that 8 vnder the crosse, as the denominator: then multiply the numerator

merator of the diuidend, that is to say of the $\frac{3}{4}$ which is 3 by the denominator of the diuisor, that is to wit, of the $\frac{2}{3}$ which is 3, and thereof commeth 9, set the 9 ouer the crosse of the numerator, which shalbe now the diuidend or number to be diuided. Then finally you shall diuide 9, by 8: and thereof commeth into the quotient 1 $\frac{1}{8}$, and so oftentimes is $\frac{2}{3}$ cōtained in $\frac{3}{4}$, as doth appeare before in the margent. But in case you would diuide $\frac{2}{3}$ by $\frac{3}{4}$, you must likewise sette your diuisor $\frac{3}{4}$ next to your left hand, as is before said. And then procéede as is aboue declared, & you shall find that $\frac{2}{3}$ diuided by $\frac{3}{4}$ bringeth into the quotient $\frac{8}{9}$, which cannot be diuided nor abbreuied. Wherefore it appeareth that $\frac{2}{3}$, being diuided by $\frac{3}{4}$, bringeth but $\frac{8}{9}$ of one vnity into the quotient, as doth appeare.

8

$\frac{3}{4}$ X $\frac{2}{3}$

9

2. Likewise if you will diuide a broken number by a whole number or else a whole number by a broken, as to diuide $\frac{3}{4}$ by 13, you shall put 1 vnder 13, it will be $\frac{13}{1}$ for your diuisor, set that toward your left hand, and then multiply 13 by 4 according to the first diuision, and thereof will come 52, for the denominator, set ẏ vnder the crosse: and multiply 3 by 1, maketh 3 for the numerator: set that ouer the crosse, and it is $\frac{3}{52}$, as appeareth in the margent.

But if you will diuide 13 by $\frac{3}{4}$, then set the $\frac{3}{4}$ next your left hand, and put one vnder 13, as in the last example, & it is $\frac{13}{1}$, set that toward your right hand thus, as appeareth in the margent, and thē worke according to the doctrine of the first Diuision, and

you shall find that 13 being diuided by $\frac{3}{4}$ bringeth into ye quotient $\frac{52}{3}$ then diuide 52 by 3, and thereof commeth 17 $\frac{1}{3}$, and so oftentimes is $\frac{3}{4}$ conteined in 13, as doth appeare.

2 1
8 2
3 3 (17 $\frac{1}{3}$

3. And if you will diuide whole nũber by whole number and broken, or els whole number & broken by whole number, as to diuide 20 by 5 $\frac{5}{6}$, you shall reduce 5 $\frac{5}{6}$ into broken, by ye first reduction, and it maketh $\frac{35}{6}$ for your diuisor, then put 1 vnder 20, & it will be $\frac{20}{1}$, then shall you multiply 35 by 1, and 20 by 6, as is taught in the other diuisions, and you shall find $\frac{120}{35}$: then diuide 120 by 35: and you shall find in your quotient 3, and $\frac{15}{35}$, the which $\frac{15}{35}$ being abbreuied, is [illegible], and so many times is 5 $\frac{5}{6}$ contained

120

$\frac{35}{6}$ X $\frac{20}{1}$

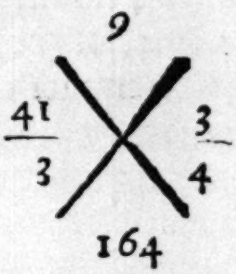
35

1
3 5
1 2 0 (3 $\frac{5}{7}$
3 8

ned in 20 as in ẏ margent appeareth.
But if you will diuide 5 $\frac{5}{6}$ by 20, you shal haue $\frac{35}{120}$, then you must diuide 35 by 120, which you cannot diuide, wherefore you shall abbreuiate $\frac{35}{120}$, and therof commeth $\frac{7}{24}$ for your quotient.

4. If you will diuide a broken number, by whole number and broken, or else whole number and broken, by a broken number. As to diuide $\frac{3}{4}$ by 13 $\frac{2}{3}$, you must reduce 13 $\frac{2}{3}$ into his broken, by the first reduction and they be $\frac{41}{3}$ for your diuisor, then multiply 41 by 4, & they make 164 for your denominator, likewise multiply 3 by 3,

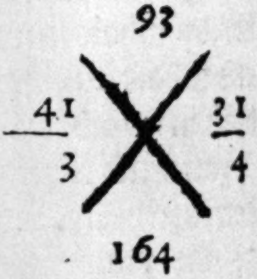
41	13 $\frac{2}{3}$



and they make 9 for the numerator, & then will your summe be $\frac{9}{164}$ as appereth in the worke afore noted. But if you will diuide 13 $\frac{2}{3}$ by $\frac{3}{4}$, then you must diuide 164 by 9, and you shall

find $18\frac{2}{9}$.

5. If you will diuide whole number and brokẽ, by whole number and broken, as to diuide $7\frac{3}{4}$ by $13\frac{2}{3}$, you must reduce the whole numbers into their broken, by the doctrine of the first reduction, and you shall find $\frac{31}{4}$ for the $7\frac{3}{4}$, and $\frac{41}{3}$ for the $13\frac{2}{3}$: Then set downe $\frac{41}{3}$ toward yͤ left hand, because it is your diuisor, and the $\frac{31}{4}$ towards the right hand, & multiply 41 by 4, for your denominator, and therof commeth 164. Likewise multiply 31 by 3, for your numerator, & it amounteth to 93: the which diuision will bee thus $\frac{93}{164}$, as before doth appeare.



But if you will diuide $13\frac{2}{3}$ by $7\frac{1}{4}$, you must (contrariwise to the other example) diuide 164, by 93: and you shall find in the quotient $1\frac{71}{93}$.

6. The broken numbers of broken, must

must be diuided in such manner as broken nūbers are, & there is no difference, sauing onely that of diuers & many broken numbers, you must make butt two broken numbers, that is to say, the one for the diuisor, & the other for the diuidend, or nūber that is to be diuided, example. If you will diuide the $\frac{3}{4}$ of $\frac{3}{5}$ of $\frac{1}{2}$, by the $\frac{2}{3}$ of $\frac{4}{7}$, you must vnderstand, that for the first, ẏ $\frac{3}{4}$ of $\frac{3}{5}$ of $\frac{1}{2}$, are $\frac{9}{40}$ by ẏ third reductiō: and the $\frac{2}{3}$ of $\frac{4}{7}$, are by the same reducti-on $\frac{8}{21}$ then haue you $\frac{8}{21}$ for your diuisor, & $\frac{9}{40}$ for your number to be diuided, then multiplie 8 by 40, which maketh 320, set ẏ vnder ẏ crosse, & multiply 9 by 21, and thereof commeth 189, which set ouer the crosse for the numerator, and they make $\frac{189}{320}$ for this diuision, as doth appeare,

$$\begin{array}{ccc} & 189 & \\ \frac{8}{21} & \times & \frac{9}{40} \\ & 320 & \end{array}$$

But if you would diuide $\frac{8}{21}$ by $\frac{9}{40}$, you must worke contrarie to the last

 example,

example, that is to say, you must di-
uide 320, by 189 : and thereof com-
meth in the quotient 1 $\frac{131}{189}$.

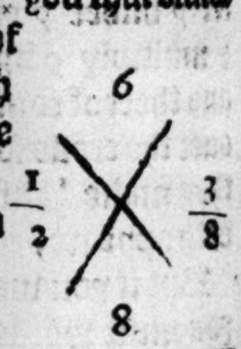
Chap. 8.

Treateth of Duplation, Triplation
Quadruplation of all broken nūbers.

If you will double any broken nūber, you shal diuide ẏ same by $\frac{1}{2}$: likewise if you will triple any fractiō, you must diuide it by $\frac{1}{3}$. And for to quadruple any brokē nūber, you shall diuide it by $\frac{1}{4}$, and so is to be understood of all other.

Example of Duplation.

If you wil double $\frac{3}{8}$ you shal diuide $\frac{3}{8}$ by $\frac{1}{2}$, and thereof commeth $\frac{6}{8}$, which being abbreuied are $\frac{3}{4}$: as by example.



Or otherwise, in case ẏ denominator of any fraction be an

euen number, you may take halfe yͤ said denominator, without any other operation, and yͤ numerator to abide still the numerator, vnto yͤ sayd halfe of the denominator of the Fraction, as by yͤ other example before rehearsed, that is to say, of $\frac{3}{8}$, take $\frac{1}{2}$ of 8, which is 4: and that is yͤ denominator, & 3 remaineth stil numerator to 4 and it maketh $\frac{3}{4}$ & so of all other. But in case the denominator bée an odde number, that is to say, not euen, then you may multiply the numerator by 2: or els dooble the numerator, which is al one thing, and that fraction shal be doubled. Example if you will double $\frac{3}{5}$, you must onely multiply yͤ numerator 3, by 2, and they 6: which maketh that fraction to be $\frac{6}{5}$, yͤ which 6 being diuided by 5, bringeth 1 $\frac{1}{5}$, & so much is the double of $\frac{3}{5}$.

Example of Triplation.

If you wil triple $\frac{3}{5}$, you must diuide $\frac{3}{5}$ by $\frac{1}{3}$, and therof commeth $\frac{9}{5}$ which

being diuided bringeth $1\frac{4}{5}$, or other-wise, because the denominator is an odde number, you may multiply the numerator 3 by 3, & therof commeth 9 which maketh $\frac{9}{5}$ as before appeared.

Examples of quadruplation.

If you will quadruple $\frac{4}{5}$, you shall diuide $\frac{4}{5}$ by $\frac{1}{4}$, and therof commeth $\frac{16}{5}$ which 16 being diuided by 5 bringeth $3\frac{1}{5}$, or otherwise, because the denominator of the fractiō in an od number, you shall multiply the numerator of the $\frac{4}{5}$, that is to say, 4 by 4, and therof commeth 16: the which diuide by 5, and you shall find $3\frac{1}{5}$ as before. And this sufficeth for Duplation, Triplation, and Quadruplation.

Chap. 9.

Of the proofes of broken numbers. *And first of Reduction.*

If you do abbreuiate ẏ brokē numbers which bee reduced, you shall returne

returne them into their first estate: as by exãple, if you reduce $\frac{2}{3}$ with $\frac{4}{5}$ you shall find $\frac{10}{15}$ and $\frac{12}{15}$, then abbreuiate $\frac{10}{15}$, and you shall find $\frac{2}{3}$, abbreuiate likewise $\frac{12}{15}$, and therof commeth $\frac{4}{5}$ as before.

The proofe of Abbreuiation.

If you doe multiply that number which you haue abbreuied, by that or those numbers, by the which you haue abreuied them, you shal return them againe into their first estate. Example, if you will abreuiate $\frac{32}{48}$ by 16, in taking the $\frac{1}{16}$ part both of the numerator, & also of the denominator, you shal find $\frac{2}{3}$, the proofe is thus, you must multiply both the numerator & denominator of $\frac{2}{3}$, ẏ is to say, 3 by 16 maketh 48 for the denominator, & 2 by 16, maketh 32 for the numerator: then set the numerator 32, ouer the denominator 48, and they be $\frac{32}{48}$ as before.

If

If you doe subtract one of the nũbers, or many of them (which you haue added) from the totall summe, there shal remaine ẏ other, or others. Example, if you do add $\frac{1}{3}$ with $\frac{1}{4}$, you shall finde $\frac{7}{12}$. The proofe is, if you subtract $\frac{1}{3}$ from $\frac{7}{12}$, you shall find remayning the other number, which is $\frac{1}{4}$, or else if you do subtract $\frac{1}{4}$ from $\frac{7}{12}$, there will remaine the other number which is $\frac{1}{3}$.

The proofe of Substraction.

If you do add that number which remaineth, with the number which you did subtract, you shall find the totall summe, out of the which you made the abatement; or otherwise, if you adde the two lesser numbers together, you shall finde the greater. Example: if you do subtract $\frac{1}{4}$ from $\frac{2}{3}$, there will remaine $\frac{5}{12}$. The proofe is thus: you must ad $\frac{5}{12}$ and $\frac{1}{4}$ together, and you shall find $\frac{16}{24}$. the which being abbreuied, doth make $\frac{2}{3}$ which

is

is the greatest number.

The proofe of Multiplication.

If you diuide the product of the whole multiplication, by ye multiplicator, you shal find in your quotiēt, the multiplicand or nūber the which you haue multiplied: or else if you diuide the totall summe which is come of the multiplicatiō, by the multiplicand: you shall find in the quotient ye multiplicator. Exāple, if you multiply $\frac{2}{3}$ by $\frac{4}{5}$, the product of this multiplication will bee $\frac{8}{15}$. The proofe is thus: you shal diuide $\frac{8}{15}$ by the multiplicator $\frac{4}{5}$, and thereof commeth $\frac{2}{3}$, which is the multiplicand, or els diuide $\frac{8}{15}$ by $\frac{2}{3}$, and you shal find the $\frac{4}{5}$, which is the multiplicator.

The proofe of Diuision.

If you do multiply the quotient by the diuisor, you shal find the number which you did diuide, that is to say, your

your diuidend. Example, if you di-
uide $\frac{2}{3}$ by $\frac{3}{4}$ your quotient will be $\frac{8}{9}$, y^e
proofe is thus, you must multiply $\frac{8}{9}$
by $\frac{3}{4}$, & thereof commeth $\frac{24}{36}$, which be-
ing abbreuied are $\frac{2}{3}$, which is your di-
uidend, and by this māner all whole
numbers haue their proofs as well as
broken numbers.

Chap. 10.

Of certaine questions done by broken numbers. *And first by Reduction.*

Find two numbers, wher-
of the $\frac{2}{7}$ of y^e one nūber,
may be equal vnto the $\frac{3}{8}$
of the other. Answ. You
shall reduce $\frac{2}{7}$ and $\frac{3}{8}$ crosse-wise, and
you shall find 16 ouer the $\frac{2}{7}$, and 21,
ouer the $\frac{3}{8}$, which are the two num-
bers that you seeke: for the $\frac{3}{8}$ of 16 are
6: and so are the $\frac{2}{7}$ of 21, likewise 6:
wherefore you may perceiue that the
$\frac{3}{8}$ of 16 which are 6, are equall vnto
the $\frac{2}{7}$ of 21, which is also 6.

2. Find two numbers, whereof y^e

$\frac{2}{3}$ of the one, may be double to the $\frac{1}{4}$ of the other. *Answer.* Double $\frac{1}{4}$, and you shall haue $\frac{2}{4}$, which being abbreuied is $\frac{1}{2}$: then reduce $\frac{2}{3}$ and $\frac{1}{2}$ crosse-wise, & you shall find 4 ouer the $\frac{2}{3}$, and 3 ouer the $\frac{1}{2}$, which are the 2 numbers that you seeke. For the $\frac{2}{3}$ of 3, which is 2, is double vnto the $\frac{1}{4}$ of 4, which is but 1.

3. Find two numbers whereof the $\frac{1}{3}$ and the $\frac{1}{4}$ of the one, may be equall vnto the $\frac{1}{4}$ & $\frac{1}{5}$ of the other. *Answere.* Adde the $\frac{1}{3}$ and $\frac{1}{4}$ together, and they make $\frac{7}{12}$, thē adde $\frac{1}{4}$ and $\frac{1}{5}$ together, & they are $\frac{9}{20}$: then reduce $\frac{7}{12}$ and $\frac{9}{20}$ crosse-wise, and you shall haue 140 ouer the $\frac{7}{12}$, & 108 ouer the $\frac{9}{20}$, which are the two numbers that you seeke. For 63 which are the $\frac{7}{12}$ of 108, are also the $\frac{9}{20}$ of 140.

4. Find two numbers, whereof the $\frac{1}{2}$ the $\frac{1}{3}$ and the $\frac{1}{4}$ of the one of them, may be equall vnto the $\frac{1}{5}$ and $\frac{1}{6}$ and $\frac{1}{7}$ of the other number. *Answere.* First you must adde $\frac{1}{2}$, $\frac{1}{3}$, & $\frac{1}{4}$ together, and they make $\frac{13}{12}$: then adde $\frac{1}{5}$, $\frac{1}{6}$, & $\frac{1}{7}$ together,

gether, and they make $\frac{107}{210}$. Then reduce $\frac{13}{12}$ and $\frac{107}{210}$ crosse-wise, as by the first question of reduction, and you shall find 2730 ouer the $\frac{13}{12}$, & 1284 ouer the $\frac{107}{210}$, which are the two nũbers that you seeke: for 1391 which is the $\frac{1}{2}$ the $\frac{1}{3}$ the $\frac{1}{4}$ of 1284: is like to the $\frac{1}{5}$, $\frac{1}{6}$, and $\frac{1}{7}$ of 2730, which is also 1391.

5. Find three numbers, whereof the $\frac{2}{5}$ of the first, the $\frac{3}{7}$ of the second, & the $\frac{4}{9}$ of the third, may be equall the one to the other. *Answere*: set downe the $\frac{2}{5}$, $\frac{3}{7}$ and $\frac{4}{9}$, and then multiply the Denominator of the $\frac{2}{5}$, that is to say 5 by the numerators of the other two Fractions, that is to say, by the numerator of $\frac{3}{7}$, and by the numerator of $\frac{4}{9}$, which is 3 and 4, and thereof commeth 60 for your first number: then shall you multiply the Denominator of the $\frac{3}{7}$, which is 7, by the numerators of $\frac{2}{5}$ and $\frac{4}{9}$, that is to say, by 2 and 4, and therof commeth 56, for the second number. Then multiply the denominator of $\frac{4}{9}$, that is to say, 9 by

by the numerator of $\frac{2}{5}$ and $\frac{3}{7}$, that is by 2 & by 3, and thereof commeth 54 for the third number. And thus the $\frac{2}{5}$ of 60, which is 24: is likewise the $\frac{3}{7}$ of 56, which is the second number, and is also the $\frac{4}{9}$ of 54, which is the third number.

6. Find thrée numbers, of which the first & the second may be in such proportion as $\frac{1}{2}$ & $\frac{1}{3}$, and the second & third in such proportion as $\frac{1}{4}$ and $\frac{1}{5}$. *Answere*. reduce $\frac{1}{2}$ and $\frac{1}{3}$ crosse-wise, and you shall haue 3 ouer the $\frac{1}{2}$, and 2 ouer the $\frac{1}{3}$, then reduce $\frac{1}{4}$ and $\frac{1}{5}$ in like manner, and you shall find 5 ouer the $\frac{1}{4}$, and 4 ouer the $\frac{1}{5}$. Then say by the Rule of thrée, if 5 do giue me 4, what shall 2 giue me, which the second proportionall, multiply the second number 4, by the third number 2, and thereof commeth 8, the which diuide by the first number 5, & thereof commeth 1 $\frac{3}{5}$ for the third proportionall: and you shall find that 3, 2, 1 $\frac{3}{5}$ are the thrée numbers proportionall that I demand, or else 14, 10, and 8, in

in whole numbers.

Questions done by addition in *Fractions.*

What number is that, unto the which if you do adde 13 the whole amounteth to 31? *Answ.* Subtract 13 from 31, & there will remain 18. which is ye number you seek

2. What number is that, unto the which if you adde $\frac{2}{5}$, the addition will be $\frac{5}{6}$? *Answere.* Abate $\frac{2}{5}$ from $\frac{5}{6}$, and there will remaine $\frac{13}{30}$, which is the number that you desire.

3. What number is that, wherunto if you adde $7\frac{2}{3}$, the whole addition will be $12\frac{1}{4}$? *Answ.* Abate $7\frac{2}{3}$ from $12\frac{1}{4}$, and the remaine will be $4\frac{7}{12}$ which is the number that you desire to know.

4. What number is that, wherunto if you adde the $\frac{1}{4}$ of it selfe, that is to say, of the number that you seeke, the whole addition may be $\frac{5}{6}$? *Answere.* Here followeth a generall rule

for

for all such like questions First of 3, which is the numerator of $\frac{3}{4}$ make ye still the numerator: and likewise of 3 and 4 added togither, which is both ye numerator, and the denominator: of ye $\frac{3}{4}$, make them your denominator: so you shall find $\frac{3}{7}$: then take the $\frac{3}{7}$ of $\frac{5}{6}$ which is $\frac{15}{42}$ or $\frac{5}{14}$, and subtract them from $\frac{5}{6}$, & there will remaine $\frac{10}{21}$, which is the number that you seeke.

5. What number is that, unto the which if you adde his owne $\frac{2}{3}$, that is to say $\frac{2}{3}$ of it selfe, the whole addition shall be 20? *Answere.* Doe as in the last question, of the numerator of $\frac{2}{3}$, that is to say; of 2: make still your numerator: & likewise of the numerator 2 & the denominator 3, of the $\frac{2}{3}$: make of them both, your denominator: and you shall find $\frac{2}{5}$, then take the $\frac{2}{5}$ of 20 which are 8, & abate them from 20, & there will remaine 12: which is the number that you desire. And so is to be done of all such like reasons.

WHat number is that, from the which if you do abate 17, ẏ rest may be 19? *Answ.* Adde 17, and 19 together, & you shall find 37, which is the number that you seeke.

2 What number is that, from the which if you abate $\frac{3}{5}$, the rest may be $\frac{1}{8}$? *Answ.* Adde $\frac{3}{5}$ and $\frac{1}{8}$ together, and you shall find $\frac{29}{40}$ which is the number that you demaund.

3 What number is that, from the which if you reduct 13 $\frac{1}{2}$ the rest may be 5 $\frac{5}{7}$? *Answ.* Adde 13 $\frac{1}{2}$ and 5 $\frac{5}{7}$ together and thereof commeth 19 $\frac{3}{14}$, which is the number that you seeke.

4 What number is that, from the which if you substract his $\frac{2}{5}$, that is to say $\frac{2}{5}$ of it selfe, the rest may be 12? *Answ.* And a rule for such like reasons: that is to say, from the denominator of $\frac{2}{5}$ which is 5 abate 2 which is his numerator, & there resteth 3 for the denominator, and thus of $\frac{2}{5}$ you haue now made $\frac{2}{3}$ then take the $\frac{2}{3}$ of

12

12 which are 8, and adde them vnto 12, and thereof commeth 20, for the number which you desire.

5. What number is that, from the which if you doe abate his $\frac{3}{4}$, the rest may be $\frac{8}{9}$? *Answ.* From the denominator of $\frac{3}{4}$, which 4, subtract his numerator 3 and there resteth 1, thus of $\frac{3}{4}$ you haue made $\frac{3}{1}$. Then multiply $\frac{3}{1}$ by $\frac{8}{9}$, and thereof commeth 2 $\frac{2}{3}$, the which adde vnto $\frac{8}{9}$, and you shal haue 3 $\frac{5}{9}$, which is the number that you seeke.

6 What number is that, from the which if you abate his $\frac{4}{5}$, the rest may be 12 $\frac{2}{3}$? *Answ.* Doe as you did in the last question, and you shall find that the $\frac{4}{5}$ wilbe $\frac{4}{1}$: And therfore multiply 12 $\frac{2}{3}$ by $\frac{4}{1}$, and thereof commeth 50 $\frac{2}{3}$, the which adde vnto 12 $\frac{2}{3}$, and you shall find 63 $\frac{1}{3}$, for the number that you demaund. And thus of all such like Questions.

Questions of Multiplication in Fractions.

WHat number is that, which being multiplyed by 13, the whole product of that multiplication shall make 221? Answ. Diuide 221 by 13, and thereof cometh 17, which is the number that you seeke.

2 What number is that which being multiplied by 15, the whole multiplication will amount to $\frac{3}{4}$? Answere. Diuide $\frac{3}{4}$ by $\frac{15}{1}$, and therof commeth $\frac{1}{20}$, which is the nūber that you seek.

2 What number is that, which being multiplied by 21, the whole multiplication will be $16\frac{4}{5}$? Answ. Diuide $16\frac{4}{5}$ by $\frac{21}{1}$, and you shall find $\frac{4}{5}$, which is the number that you demand.

4 What number is that which being multiplyed by $\frac{3}{4}$, the multiplication will amount to 18? Answ. Diuide $\frac{18}{1}$ by $\frac{3}{4}$, and therof commeth 24, which is the number that you desire to know.

5 What number is that which if

it

it be multiplied by $\frac{2}{3}$, the whole multiplication will be $\frac{3}{4}$? Answ. Diuide $\frac{1}{4}$ by $\frac{2}{3}$, & the quotient will be $\frac{3}{8}$ which is the number that you require to know.

6 What number is that which being multiplied by $\frac{5}{8}$, the product of ẏ multiplication will bee 16 $\frac{2}{3}$? Answere. Diuide 16 $\frac{2}{3}$ by $\frac{5}{8}$, and thereof commeth 26 $\frac{2}{3}$, which is the number that you seeke.

Heere ensueth other necessarie questions, *which are wrought by Multiplication in broken numbers.*

I Demaund how much the $\frac{5}{8}$ of 20 shillings are worth, or what are ẏ $\frac{5}{8}$ of 20 shillings? Answ. You must multiply $\frac{5}{8}$ by $\frac{20}{1}$, and ẏ product will be $\frac{100}{8}$, therfore diuide 100 by 8, and thereof cōmeth 12 $\frac{1}{2}$, which is to say, 12s, 6d. and so much are the $\frac{5}{8}$ of 20 shillings worth.

2 I demaund what the $\frac{3}{4}$ of $\frac{5}{6}$ of a pound of money are worth? that is

 to

to say of 20 s. *Answ.* Multiply $\frac{3}{4}$ by $\frac{5}{6}$, and thereof commeth $\frac{5}{8}$: Then take the $\frac{5}{8}$ of 20 shillings, as in the last Question going before, and you shal find 12 s, 6 pence, and so much are $\frac{3}{4}$ of $\frac{5}{6}$ of 20 s. worth.

3 I demaund what the $\frac{2}{3}$ of 8 d. $\frac{1}{2}$ are worth? *Answ.* Multiply 8 $\frac{1}{2}$ by $\frac{2}{3}$ or else $\frac{2}{3}$ by 8 $\frac{1}{2}$, which is all one, & you shall find $\frac{34}{6}$. Then diuide 34 by 6, and your Quotient will be 5 pence $\frac{2}{3}$, & so much are the $\frac{2}{3}$ of 8 d. $\frac{1}{2}$ worth.

4 What are the $\frac{3}{4}$ of 14 pence $\frac{3}{5}$? *Answ.* Multiply 14 $\frac{3}{5}$ by $\frac{3}{4}$, and thereof commeth $\frac{219}{20}$: Therfore diuide 219 by 20, and your Quotient wilbe 10 pence, $\frac{19}{20}$: and so much are the $\frac{3}{4}$ of 14 $\frac{3}{5}$.

5 How many quarters or fourth parts are contained in 7 $\frac{2}{3}$? *Answ.* Multiply 7 $\frac{2}{3}$ by $\frac{4}{1}$ (because one whole containeth 4 quarters) and thereof commeth 30 $\frac{2}{3}$, & so many quarters are in the 7 $\frac{2}{3}$, that is say, 30 quarters and $\frac{2}{3}$ of a quarter.

6 How

6. How many thirds are in $\frac{3}{4}$ and $\frac{1}{2}$, that is to say in 3 quarters, and $\frac{1}{2}$ of one quarter? which are by the fift reduction. *Answ*: multipltiply $\frac{7}{8}$ by $\frac{3}{1}$ (for because that in 1 whole are cõtained 3 thirds) and therof commeth 2 $\frac{5}{8}$, the which 2 $\frac{5}{8}$ doth signifie $\frac{2}{3}$, and $\frac{5}{8}$ of a third: and so many thirds are in $\frac{3}{4}$ and $\frac{1}{2}$ or in $\frac{7}{8}$, which is all one.

Questions done by Diuision in *broken number.*

1. What number is that, which being diuided by 17, the quotient will be 13? *Answere*: multiply 17 by 13, and thereof commeth 221, which is the number that you seeke.

2. What number is that, which being diuided by $\frac{1}{3}$, the quotient will be 21? *Answere*: multiply $\frac{21}{1}$ by $\frac{3}{4}$, & therof commeth $\frac{63}{4}$: Then diuide 63 by 4, & therof commeth 15 $\frac{3}{4}$: which is the number that you seeke.

3. What number is that, which being diuided by $\frac{1}{8}$, the quotient will

be $\frac{2}{3}$? *Answere*: multiply $\frac{1}{3}$ by $\frac{1}{8}$, and thereof commeth $\frac{2}{24}$: which being abbreuied are $\frac{1}{12}$, for the number which you require.

4. What number is that, which being diuided by $\frac{4}{5}$, the quotient will be $16\frac{2}{3}$? *Answere*: multiply $16\frac{2}{3}$ by $\frac{4}{5}$, and thereof commeth $\frac{200}{15}$. Therefore diuide 200 by 15, & therof commeth $13\frac{1}{3}$, which is the number that you desire to find.

5. What number is that, which being diuided by $13\frac{1}{3}$, the quotient will be 20? *Answere*: multiply $\frac{20}{1}$ by $13\frac{1}{3}$, and thereof commeth $\frac{800}{3}$, then diuide 800 by 3, and therof commeth $266\frac{2}{3}$: for the number which you seeke.

6. What number is that, which if it be diuided by $12\frac{1}{2}$ the quotient wil be ? *Answere*: multiply $12\frac{1}{2}$, by $\frac{7}{8}$, & therof commeth $\frac{175}{16}$: then diuide 175 by 16, and therof commeth $10\frac{15}{16}$: for the number which you desire.

Other

Other necessary questions done by *Diuision in broken numbers.*

I Demand what part 30 is of 70? *Answere*: diuide 30 by 70, which you cānot, for they are $\frac{30}{70}$, but abreuy thē, & they are $\frac{3}{7}$: thus 30 are ẏ $\frac{3}{7}$ of 70

2. I demaund what part 10 is of $16\frac{2}{3}$? *Answere*: diuide $\frac{10}{1}$ by $16\frac{2}{3}$, and thereof commeth $\frac{30}{50}$ which being abbreuied are $\frac{3}{5}$. And thus 10 is found to be $\frac{3}{5}$ of $16\frac{2}{3}$.

3. More $\frac{5}{8}$ of one vnity, what part are they of 25? *Answere*: diuide $\frac{5}{8}$ by $\frac{25}{1}$, and thereof commeth $\frac{5}{200}$, which being abbreuied is $\frac{1}{40}$, and thus $\frac{5}{8}$ of 1, is but the $\frac{1}{40}$ of 25.

4. More $\frac{5}{6}$ what part are they of $\frac{7}{8}$? *Answere:* diuide $\frac{5}{6}$ by $\frac{7}{8}$, and you shall find $\frac{40}{42}$ which abbreuied are $\frac{20}{21}$.

5 More $\frac{4}{5}$ of 1, what part are they of $13\frac{1}{3}$? *Answere*: diuide $\frac{4}{5}$ by $13\frac{1}{3}$, and you shal find $\frac{12}{200}$, which being abbreuied are $\frac{3}{50}$: And thus $\frac{4}{5}$ of 1, are the $\frac{3}{50}$ of $13\frac{1}{3}$.

6. More $12\frac{1}{2}$ what part are they of 30?

30? *Answere* diuide 12 $\frac{1}{2}$ by $\frac{30}{1}$, and you shall find $\frac{25}{60}$, which being abbreuied are $\frac{5}{12}$ and thus 12 $\frac{1}{2}$, are the $\frac{5}{12}$ of 30.

7. More, 16 $\frac{2}{3}$ what part are they of 57 $\frac{1}{7}$? *Answer*: diuide 16 $\frac{2}{3}$ by 57 $\frac{1}{7}$, & thereof cōmeth $\frac{350}{1200}$ which being abbreuied are $\frac{7}{24}$: and thus 16 $\frac{2}{3}$ are the $\frac{7}{24}$ of 57 $\frac{1}{7}$.

8. More $\frac{3}{4}$ and $\frac{2}{3}$ of $\frac{1}{4}$, or 3 quarters and $\frac{2}{3}$ of one quarter, what part are they of 1? *Answere*: reduce $\frac{3}{4}$ and the $\frac{2}{3}$ of $\frac{1}{4}$ into one broken number by the 5 reduction, and you shall find $\frac{11}{12}$. And thus the $\frac{3}{4}$, and $\frac{2}{3}$ of $\frac{1}{4}$, are the $\frac{11}{12}$ of 1 whole.

9. More of what number are 9, the $\frac{2}{3}$? *Answ*: diuide 9 by $\frac{2}{3}$, & thereof commeth 13 $\frac{1}{2}$: which is the nūber whereof 9 are the $\frac{2}{3}$.

10. More of what number are $\frac{2}{5}$ the $\frac{3}{4}$? *Answ*: diuide $\frac{2}{5}$ by $\frac{3}{4}$, and thereof commeth $\frac{8}{15}$: which is the number whereof $\frac{2}{5}$ are the $\frac{3}{4}$ of the same number.

11. More, of what number are 5 $\frac{3}{4}$ the

the $\frac{3}{7}$? *Answere*: diuide 5 $\frac{3}{4}$ by $\frac{3}{7}$, and you shall find 13 $\frac{5}{12}$ which is the nũber whereof 5 $\frac{3}{4}$ are the $\frac{3}{7}$.

12. More, 9 $\frac{2}{3}$ what part are they of 33 $\frac{1}{2}$? *Answere*: diuide 9 $\frac{2}{3}$ by 33 $\frac{1}{2}$, and therof commeth $\frac{58}{201}$: and thus 9 $\frac{2}{3}$ are the $\frac{58}{201}$ of 33 $\frac{1}{2}$ as appeareth.

The

The Third part treateth of certain briefe Rules, called rules of Practise, with diuers necessarie Questions: profitable *not alonely for Marchants, but also for all other Occupiers.*

Chap. 1.

SOme there be, which do cal these Rules of practise, briefe Rules: for that by them, many questions may be done with quicker expedition, than by the Rule of three. There bee others which call them the small multiplication, for because that the product is allwaies lesse in quantity, than the number which is to bee multiplied. This practise commeth not in vse, but onely among small kinds of nūbers, which haue ouer them other numbers that are greater. And this being well considered, is

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no other thing but to conuert lesser, and particular kinds of nũber, into greater: the which may be done by ỹ meanes of diuisiõ, in taking ỹ halfe, the third, the fourth, the fift, or such other parts of the summe, which is to be multiplied, as the multiplier is part of his greater kinde, and that which commeth thereof, is worth as much (not in quantity, but in his owne fourme and qualitie) as if you did multiply simply the two summs, the one by the other. And for ỹ better vnderstanding of such conuersions, you must haue respect to one of these two considerations: the first is, when one would demaund this question; At 6 d. the yard of Cotton, what are 18 yards, worth by the price? It is manifest ỹ they are worth 18 péeces of 6 pence the péece, or 18 halfe shillings, which must bée turned into shillings, in taking the halfe of 18 s̃, and they make 9 s. Or otherwise you must consider that at 1 s the yard, ỹ 18 yards are worth 18 s. therefore at

at 6 d they shal be but halfe so much, for 6 d. is but the $\frac{1}{2}$ of 1 s. Therefore you must take the $\frac{1}{2}$ of 18 s. and they make 9 s. which are worth as much as 108 d, that is to say, as 18 times 6 pence.

Rule 1. First, if you will multiply any number after this maner by pence, whereof the number of the same pence doe not extend unto 12, and thereof to bring shillings into the product: you must know the aliquot parts of 12, which are these: that is to say, 6, 4, 3, 2, and 1. For 6 is the $\frac{1}{2}$ of 12, and 4 is the $\frac{1}{3}$ of 12, 3 is the $\frac{1}{4}$, 2 is the $\frac{1}{6}$, and 1 is $\frac{1}{12}$. Then for 6 d which is the halfe of 1 shilling, you must take the $\frac{1}{2}$ of all the number which is to be multiplyed: And that which commeth therof, shalbe shillings: if there doe remaine 1, it is 6 pence.

An aliquot part, is an euen part of a shilling or of a pound, or of any other thing, as $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, $\frac{1}{5}$, &c. are called aliquot parts

For foure pence, you must take the $\frac{1}{3}$ of all the number, that is to be multiplyed: and if any unities doe remaine, they shall be thirds of a shilling, euery one being in value 4 d.

For

For 3 pence you muſt take the $\frac{1}{4}$ of al the ſum: if any vnities do remain, they ſhalbe fourths of a ſhilling, euery one being worth 3 pence.

For 2 pence you muſt take the $\frac{1}{6}$ of all the ſumme, and if any vnities doe remaine, they ſhall bee ſix parts of a ſhilling, beeing euery one of them worth 2 pence.

For 1 d. take the $\frac{1}{12}$ of the whole ſum, if any vnities doe remaine, they are the twelfth parts of a ſhilling each of them being in value 1 d. as by theſe examples following doth plainly appeare.

For

Example. j.

At 6 pence the yarde.
What are 59 yards worth?

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29 ſhil. 6. pence.

ii.

At 4 pence the yarde.
What 82 yards.

---

27 ſhil. 4 pence.

iii.

iij.

At 3 Pence the yard.
What 97 yardes?

24 *shil.* 3 *Pence.*

iiij.

At 2 Pence the yard.
What 346 yardes?

57 *shil.* 8 *Pence.*

v.

At 1 Penie the yard.
What 343 yardes?

28 *shil.* 7 *Pence.*

Here you may see in the first example, that 59 yardes, at 6 pence the yard, are worth 29 shillings 6 pence, in taking the $\frac{1}{2}$ of 59. And in the second example, the 82 yards at 4 d. the yard, are worth 27 s. 4 d. in taking the $\frac{1}{3}$ of 82.

Like-

Likewise, in the third example 97 yardes, at 3 pence the yard bringeth 24 shillings 3 pence: in taking the $\frac{1}{4}$ of 97. Also in the fourth example 346 yards, at 2 pence the yard, maketh 57 shillings 8 pence, in taking the $\frac{1}{6}$ of 346. And finally in the fift example: 343 yardes, at 1 d. the yard amount to 28 shil. 7 d. in taking the $\frac{1}{12}$ of 343. And so is to be done of all such like, whẽ the nũber of the pence is any of the aliquot parts of 12.

But if the number of the pence be not an aliquot part of 12: you must reduce them into some aliquot parts of 12: and after the aforesaid mãner, you shall make of them two or thrée products as néed shall require, and adde them together into one summe, as 5 d. may be reduced into 4 d. & 1 d. or else into 3. and 2 d. For 4 d & 1 d. do make 5 d. & so do 3 d. & 2 d. the like. Wherfore if you will worke by 4, & by 1: you must for 4 d take first the $\frac{1}{3}$, of the number that is to be multiplied, and for 1 d. take the $\frac{1}{12}$ of whole Rule. 2.

summe or rather for 1 d. ye may take ẏ $\frac{1}{4}$ of the product which did come of the 4 d. because that 1 d. is the $\frac{1}{4}$ of 4 d. But if you will worke by 3 d. and 2 d. you shall take for 3 d. the $\frac{1}{4}$ of the nũber which is to be multiplyed: & likewise for 2 d. the $\frac{1}{6}$ of the same number adding together both the products: The totall summe of those two numbers shall be the solution to the question. And in like manner is to be done of all others. As by these examples following may appeare.

j. Example.

At 5 Pence the yarde.
What will 49 yards amount vnto?

16 *shil.* 4 *pence.*
4 *shil.* 1 *d.*
20 *shil.* 5 *d.*

ij.

At 7 *d. the lib.*
What will 54 *lib. cost?*

18 *shil.* 0 *d.*
13 *shil.* 6 *d.*

31 *shil.* 6 *d.*

iij.

At 8 *d. the peece.*
What are 40 *worth?*

13 *shil.* 4 *d.*
13 *shil.* 4 *d.*

26 *shil.* 8 *d.*

Other waies.

What are 40 *peeces worth?*
At 8 *d. the peece.*

20 *shil.* --
6 *shil.* 8 *d.*

26 *shil.* 8 *d.*

iiij.

At 9 Pence the yard.
What are 37 yardes?

36 *shil.* 6 *d.*
18 *shil.* 3 *d.*

54 *shil.* 9 *d.*

v.

At 10 *d. the elle.*
What are 32 *elles?*

16 *shil.* 0.
10 *shil.* 8

26 *shil.* 8 *d.*

vj.

At 11 *d. the lib.*
What are 27 *lib?*

9 *shil.* 0.
9 *shil.* 0.
6 *shil.* 9.

24 *shil.* 9 *d.*

Here

Here in this first example, where it is demaunded (at 5 pence the yarde) what will 49 yards amount unto? First for 4 pence, I take the $\frac{1}{3}$ of 49 s. & thereof commeth 16 s. 4 d. then for 1 d. I take the $\frac{1}{4}$ of the same product that is to say, of 16 s. 4 d. and that bringeth 4 s. 1 d. these 2 summes added together doe make 20 s. 5 d. And so much are ye 49 yards worth, at 5. the yarde.

For 7 d. take the $\frac{1}{3}$ and the $\frac{1}{4}$ of the whole sum which is to multiplied, and adde thē together, that is to say, for 4 d. you must take $\frac{1}{3}$: & for 3 d. the $\frac{1}{4}$:because 4 d. is the $\frac{1}{3}$ of 12 d. & 3 d. is the $\frac{1}{4}$, as in the second example before doth appeare, where ye question is thus, at 7 d. the li. what wil 54 li. cost? First for 4 d. I take ye $\frac{1}{3}$ of 54 & they make 18 s. Likewise for 3 d. I take $\frac{1}{4}$ of 54, and they are 13 s. 6 d. Then I ad 18 s, and 13 s. 6 d. together so both amount to 31 s. 6 d. and so much are the 54 li. at 7 d. the li.

Otherwise, for 7 d. you shall take

first the $\frac{1}{2}$ of the whole sum for 6 d. Then for 1 d. you must take ỷ $\frac{1}{6}$ of ỷ same product, and ad them together, so you shall haue the like summe as before.

For 8 pence, you must first take $\frac{1}{3}$ of the whole summe for 4 pence: and another $\frac{1}{3}$ for other 4 d. and adde them together, as in this example doth euidently appeare. Where the question is thus, at 8 d, the péece, what are 40 péeces worth? First for 4 d, I take ỷ $\frac{1}{3}$ of 40 which is 13 s, 4 d: Againe, I take another $\frac{1}{3}$ for the other 4 pēce which is also 13 s, 4 pence. These two summs being added together, do make 29 shillings 8 pence, and so much are the 40 péeces worth, at 8 pence the péece: as in the third example abouesaid doth appeare.

Otherwise: for 8 pence, you may take first the $\frac{1}{2}$ of the whole summe for 6 d. Thē for 2 d you shall take the $\frac{1}{3}$ of the product, which did come of ỷ sayd $\frac{1}{2}$ and adde thē together: so shall you haue likewise the solution to the question.

question As in the same third exam-ple of 40 yards: I take first the $\frac{1}{2}$ of 40 for 6d. and thereof commeth 20 s. then for 2 d. I take $\frac{1}{3}$ of the sayd product, that is to say of 20s, which bringeth 6s, 8d. these two summes (20s, and 6s, 8 d.) I adde together, & they make 26 s, 8 d. as before.

For 9 d, you must take the $\frac{1}{2}$, & the $\frac{1}{4}$ of the whole sum, and adde them together: or else for 6d, take first $\frac{1}{2}$ of the whole summe, then for 3 d, take ŷ $\frac{1}{2}$ of ŷ same product, because 3 d. is ŷ halfe of 6 d. And 6 d, added with 3 d, bringeth 9 d, as by ŷ fourth exãple: where it is demanded after this sort, at 9d, the yard, what are 73 yardes worth? First for 6d. I take the $\frac{1}{2}$ of 73: and thereof commeth 36s, 6 d. thẽ for 3 d, I take $\frac{1}{2}$ of the same 36 s, 6 d, which is 18 shil 3d, these two summes I adde together, and they make 54 s, 9d, as in the sayd fourth example is euidẽnt.

For 10 d. take first the $\frac{1}{2}$ thẽ the $\frac{1}{3}$ of the whole summe: and adde them

together and it is done.

For 11 d. take first $\frac{1}{3}$ for 4 d. secondly, another $\frac{1}{3}$ for other 4 d. and thirdly $\frac{1}{4}$ for 3 d. (of all the whole summe) & adde them together, and that answereth the question.

Or else for 11 d. take first the $\frac{1}{2}$ for 6 d. Then the $\frac{1}{3}$ of the whole sum for 4 d: and finally the $\frac{1}{4}$ of the last product for 1 d adding them together, and it will be like to the other.

Rule. 3. Likewise by the same reason, when you will multiply (by shillings) any number that is vnder 20 s. you shall haue in the product pounds, if you know the aliquot parts of 20, which are these: 10, 5, 4, 2, and 1. For 10 is the $\frac{1}{2}$ of 20, 5 is the $\frac{1}{4}$ part, 4 is the $\frac{1}{5}$, 2 is the $\frac{1}{10}$, and 1 is the $\frac{1}{20}$.

Then for 10 s, which is the $\frac{1}{2}$ of a pound, you must take the $\frac{1}{2}$ of ye number which is to be multiplyed, & you shall haue pounds in the product. If there do remaine 1, it shall be worth 10 shillings.

For

For 5 shillings, you must take the $\frac{1}{4}$ of the number which is to be multiplyed, and if there do remaine any vnities, they shal be fourth parts of a pound, euerie vnitie being in value 5 s.

For 4 s you must take the $\frac{1}{5}$ of y^e^ number which is to bee multiplyed: And if there do remaine any vnities, they shal be fift parts of a pound, euery vnitie being worth 4 shillings.

Example.

At 10 *shillings the peece.*
What are 75 *peeces worth?*

37 *lib.* 10 *shil.*

At 5 *shil. the yarde.*
What are 89 *yardes worth?*

22 *lib.* 5 *shil.*

At 4 *shil. the elle.*
What are 93 *elles worth?*

18 *lib.* 12 *shil.*

For

For 2 shillings, you must take ye $\frac{1}{10}$ of the number that is to be multiplyed. Wherefore if you will take ye $\frac{1}{10}$ of any number: you must separate the last figure of the same number, (which is neerest your right hand) from all ye other figures, with a smal strike or dash with a pen. For all the other figures which doe remaine towards your left hand from the same figure that you doe separate, shall bee the sayd $\frac{1}{10}$ of a pound; & that figure so separated, toward your right hand shall be so many peeces of 2 shillings the peece, the which figure must bee doubled to make therof shillings, as by these examples appeareth.

At 2 shil. the lib.

What are 9|8 *lib. worth?*

9 *lib.* 16 *shil.*

At 2 shil. the dozen.

What are 40|3 *dozens worth?*

40 *lib.* 6 *shil.*

Here-

Hereupon dependeth another exact way for to multiply by ſhillings (if the number of ſhillinges bée euen) which is thus: you ſhal take ½ the nũber of the ſame ſhillings, & conuert them into péeces of 2 ſhillings. Then by the number of this halfe, you muſt firſt multiply the laſt figure (toward your right hand) of the nũber which is to be multiplied. And if there be any tennes in the ſame product, thoſe muſt you reſerue in your mind: But if (with the ſame, or elſe without the ſame) you doe find any diget number yͤ ſame diget nũber ſhal you double, & put it in the place of ſhillings. Thẽ muſt you procéed to yͤ multiplicatiõ of yͤ other figures, adding vnto yͤ product, the tens which you before reſerued: and thereof ſhall come pounds. Rule 4.

Now for your better vnderſtãding of this which hath béen ſaid, and by yͤ way of exãple: I will propone vnto you this queſtion.

At 8 ſhillings the groſſe, what are 97 groſſe worth after the rate?

Firſt

First in this example I take halfe the nūber of shillings, as before is taught that is to say, of 8 shillings which is 4 shillings: this 4 shillings I put apart behind a crooked line, right against 97 towards the left hand, as here you may see, & as hereafter appeareth by divers examples.

At 8 shil. the grosse.

4) *What will* 9 | 7 *grosse cost?*

38 *lib* 16 *shil.*

At 6 shil. the yarde.

3) *What* 9 | 9?

29 *lib.* 14 *shil.*

At 12 *shil.*

6) *What* 34 | 5?

207 *lib.* 0 *shil.*

At 14 *shil.*

7) *What* 21 | 0?

147 *lib.* 0 *shil.*

Now

Now in ÿ first example, where it is demanded at 8 s. the grosse, what are 97 grosse? First the ½ of 8 s. which is 4 s being set apart behind the croked line, as before is sayd: then I multiply the 97 by 4, saying first, 4 times 7, is 28. I double the diget number 8, and that maketh 16, the which 16, I do put vnder the line, in the place of shillings, and I keepe the 2 tennes in my mind, which here in worke doe represent 2 li. Then secondly I multiply 9 by the said 4, and thereof commeth 36 whereunto I adde the 2 li. which before I did reserue, and they make 38. Therfore I put 38, vnder the line in the place of pounds, and the whole summe will be 38 li. 16 s. Thus much are the 97 grosse worth, at 8 shillings the grosse: the like is to be done of all other. As of 12 shil. in multiplying by 6. Likewise of 6 shil. if you multiply by 3: also of 14, if you multiply by 7. And so of all euē numbers after the same manner.

For 1 shilling you must take the ½ of

of the $\frac{1}{10}$ part of any nūber that is to be multiplyed.

And if any thing doe remaine they are shil. Thus by this manner shil. are conuerted into pounds: for it is euen like as though you did diuide thē by 20 s. as by this example in the margēt doth appeare. Where it is demanded at 1 s, ẏ yard the péece or any other thing, what are 350 yards or péeces worth.

At 1 shil.
VVhat 350

17 *li.* 10 *shil.*

First I separate ẏ last figure of 350 next to my right hand, which is the 0, with a line betwéene it and the figure 5. Then I make a line vnder ẏ 35|0, and I take ẏ $\frac{1}{2}$ of 35, after this manner: saying the $\frac{1}{2}$ of 3 is 1, & 1 remayneth, which remaine signifieth 10, in that second place: Then I put 1 vnder the line against 3, and I procéed to the rest, saying the halfe of 15 is 7, (the which 15 came of the 1 that remained, & of the 5 in ẏ first place.) I put 7 vnder the line, right against

5, and

5, and they make 17 li. The 1 which did laſt remaine, is 10 s. Now I put 10 s. apart vnder the line, and the whole ſumme is 17 li. 10 s. ſo much are 350 worth at 1 s. the péece.

But when the number of ſhillings is not ſome aliquot part of 20 s. you muſt then conuert the ſame number of ſhillings, into the aliquot parts of 20, and make two or thrée products: as néed ſhall require, the which muſt be added together after this manner following.

For 3 ſhillings you muſt firſt take for 2 s. the $\frac{1}{10}$ of the number that is to be multiplyed, then for 1 ſhilling, you muſt take the $\frac{1}{2}$ of the product which did come of the ſame $\frac{1}{10}$ part: and add theſe two ſummes together, as appeareth by this example following.

At 3 s. the péece of any thing, what ſhall 684 péeces coſt me after ỹ rate? Firſt, for 2 ſhillings I take the $\frac{1}{10}$ of

684, which is 68, in separating the last figure 4, which I must double, and they be 8: I set 8 s. apart

At 3 shil.	
What 68 | 4?	
68 li.	8 shi.
34 li.	4 shi.
102 li.	12 shi.

from the place of pounds, and then I haue 98 pounds 8 s. for ẏ $\frac{1}{10}$ part, that is to say, for the 2 s. secondly, for 1 s. I take the $\frac{1}{2}$ of the product, that is to say: of 68 li. 8 s. which is 34 li. 4 s. and I put the same vnder the 68 li. 8 shil. Then finally, I adde those two summes togither, that is to say 68 li. 8 s. and 34 li. 4. s. so they make 102 li. 12 s, and so much are ẏ 684 péeces worth at 3 shil. the péece, as may appeare in the margent.

For 6 shil. take $\frac{1}{10}$ of the number which is to be multiplyed: ẏ is to say, take first $\frac{1}{10}$, then double the product of the same $\frac{1}{10}$, and adde thē together. Or otherwise for 4 s. take first the $\frac{1}{5}$ of the number that is to be multiplyed, then for 2 s. take $\frac{1}{2}$ of the product, and adde

adde them together.

Or else take for 5 shil. the $\frac{1}{4}$ of the whole summe, then for 1 shil take the $\frac{1}{5}$ of the product, and adde them together.

Likewise for 7 shil. take first for 5 shi. the $\frac{1}{4}$, then for 2 shil. take the $\frac{1}{10}$ of the nūber which is to be multiplied, and adde them together.

For 8 shillings take the $\frac{1}{5}$ at two sundry times, that is to say, first $\frac{1}{5}$ for 4 shil. and then as much more for other 4 shil and adde them together.

For 9 shil take first the $\frac{1}{4}$ and likewise the $\frac{1}{5}$ of the number that is to be multiplyed, and adde them together.

For 11 shil take first the $\frac{1}{2}$ for 10 s. Then for 1 shil. take the $\frac{1}{10}$ of the product, & adde them together, or else for 5 s. take ye $\frac{1}{4}$: then for 4 s. take the $\frac{1}{5}$, & lastly for 2 s. take the [illegible] of the last product, and adde them together.

For 12 shil. take first the $\frac{1}{2}$ for 10 shil. then for 2 s take the $\frac{1}{5}$ part of the product, and adde them together.

For 13 s. take the $\frac{1}{4}$ then the $\frac{1}{5}$, & a-

gaine another $\frac{1}{5}$ of the number which is to be multiplyed, and adde the products together, that is to say: first for 5 shil: take the $\frac{1}{4}$: then for 4 shil: take the $\frac{1}{5}$. And againe another $\frac{1}{5}$ for the other 4 s̄ & adde the thrée products together, the like is to be done in all others, whē the price of ẏ thing which is valued, is onely of shillings, as by these examples following doth plainly appeare.

At 6 shil.
What 67?

13 lib.	8 shil.
6	14
20 lib.	2 shil.

At 7 shil.
What 247?

86	15
34	14
121 lib.	9 shil.

At

At 8 shil.
What 540?

108 lib. 0 shil.
108 0

216 lib. 0 shil.

At 9 shil.
What 230?

57 10
46 00

103 lib. 10 shil.

At 11 shil.
What 159?

79 10
7 19

87 li. 9 shil.

At 12 shil.
What 349?

174. 10
34 18

209 li. 8 shi.

At 13 *shil.*
What 267?

66.	15.
53.	8.
53.	8.
173. *lib.*	11 *shil.*

Likewise in multiplying by pence, you shall haue (at the first instant) pounds in the product, in case you know the aliquot parts of the $\frac{1}{10}$ of a pound, or of 24 pence, which are these 12, 8, 6, 4, 3, and 2. For 12, is the $\frac{1}{2}$ of 24: 8 is the $\frac{1}{3}$: 6 is the $\frac{1}{4}$: 4 is the $\frac{1}{6}$: 3 is the $\frac{1}{8}$: and 2 the $\frac{1}{12}$ but for 12 pence which is 1 shil. I haue before made mention thereof.

For 8 d. you must take the $\frac{1}{3}$ of the $\frac{1}{10}$ and the rest which are the peeces of 8 d. must be doubled to make of them peeces of 4 d. And of the same nũber being doubled, you must take the $\frac{1}{3}$ which will be shillings, & if there doe yet remain any thing, they are thirds of a shilling, being in value 4 pence the peece.

For

For 6 d. take the $\frac{1}{4}$ of the $\frac{1}{10}$, & of that remaineth you must take the $\frac{1}{5}$ which shall be shillings: if there doe yet remaine 1, it shall bee in value 6 pence.

For 4 d, you must take the $\frac{1}{6}$ of ye $\frac{1}{10}$ and of that which resteth take ye $\frac{1}{3}$ to make therof shillings: if any thing doe yet remaine, they are thirds of a shilling, being in value 4 pence the peece.

For 3 pence take the $\frac{1}{8}$ of the $\frac{1}{10}$, & of that remaineth, take the $\frac{1}{4}$ to make of them shillings: if any thing doe yet remaine, they are fourths of a shilling, every one of them beeing worth 3 d.

For 2 d take the $\frac{1}{12}$ of the $\frac{1}{10}$, & of that which resteth, take $\frac{1}{6}$, ye which are shillings, if there doe still remain any thing, they shall be sixt parts of a shil, every one being in value 2 d.

For 1 d you shall understād ye it is not possible with ease to bring of d. poundes (into the product) upon the total sum: But first you must bring

 them

thē into shillings, by the order of the second Rule of this Chapter, & then afterward you shal conuert them into poūds, if néed so require, as by these examples following may appeare.

At 8 d.
What 59|6?

19 lib. 17 shil. 4 d.

At 6 d.
What 67|8?

16 li. 19 shil.

At 4 d.
What 93|4?

15 lib. 11 shil. 4 d.

At 3 d.
What 57|1?

7 lib. 2 shil. 9 d.

At 2 d.
What 36|4?

3 lib. 0 shil. 8 d.

At

At 1 d.
What 67|6?

5 lib. 12 shil. 8 d

2 lib. 16 shil. 4 d.

But if the number of pence, be not an aliquot part of 24 pence: Then must you bring then into the aliquot parts of 24, and make thereof divers products, which must be added together, as shal hereafter appeare.

For 5 pence, you shall first take the 3 pence, then for 2 pence, and ad thē together, according to the instruction of the last Rule. Or else, first take for 4 pence, and then for 1 d,

For 7 d, first take for 4 d, thē for 3 pence, and adde them together.

For 9 d first take for 6 d, thē for 3 pence adding them together.

For 10 d, first take for 6 d, then for 4 pence, and adde them together.

For 11 d, take first for 8 d, then for 3 d, & adde them together: as by these examples following doth appeare.

At 5 d.
What 92|7?

11	11	9
7	14	6

19 lib. 6 shil. 3 d.

At 7 d.
What 51|2?

8	10	8
6	8	0

14 li. 18 shil. 8 d.

At 9 d.
What 54|6?

13	13	0
6	16	6

20 lib. 9 shil. 6 d.

At 10 d.
What 27|3?

6	16	6
4	11	0

11 lib. 7 shil. 6 d.

At 11 d.
What 26|4?

8	16 .	0
3	6	0

12 *lib.* 2 *shi.* 0 *d.*

If you will multiply any nūber by shillings, and pence béeing both together, you must take first for ẏ s. according to the instruction of the third rule of this first chapter, then take for the pence after the order of the 5 rule before mentioned: but if there be any aliquot parts of 1 li. containing both shillings and pence, then for those parts you shall take such like part of the number that is to bée multiplied as the nūber is part of 1 li. ẏ which aliquot parts are these, 6 s. 8 d. 3 s. 4 d. 2 s. 6 d: and 1 s. 8 d. For 6 s. 8 d, is the $\frac{1}{3}$ of a li. 3 s. 4 d. is the $\frac{1}{6}$ of a li: 2 s, 6 d, is the $\frac{1}{8}$: and 1 s, 8 d. is the $\frac{1}{12}$ of a li or of 20 s. And therefore for 6 s. 8 d you must take the $\frac{1}{3}$ of the nūber that is to bée multiplied: and if any thing dée remaine, they are thirds

of a

of a li every one being worth 6 s. 8 pence.

For 3 s. 4 d. you must take the $\frac{1}{6}$ of the number which is to be multiplied, and if any thing doe remaine, they are sixt parts of a li euerie one being in value 3 s, 4 d.

For 2 s, 6 d. you must take the $\frac{1}{8}$: if any thing be remaining they are 8 parts of a li. each one being worth 2 s, 6 pence.

For 1 s, 8 d, you shall take the $\frac{1}{12}$ the number that is to bee multiplied, and if there doe any thing remaine, they are twelue parts of a pound, euery one being in value 1 shilling 8 pence.

At 6 shil. 8 d.
What 647?

215 *lib.* 13 *shil.* 4 *d.*

At 3 *shil.* 4 *d.*
What 220.

36 *lib.* 13 *shil.* 4 *d.*

At

At 2 shil. 6 d.
What 47

5 lib. 17 shil. 6.

At 1 shil. 8 d.
What 400

33 lib. 6 shil. 8 d.

Here shal you accustome your selfe to multiply by all sorts of summes, being composed of shillings, & pence, which may come in vse or practise. As thus, for 1s, 1d: for 1s, 2d: 1s, 3d: for 1s, 4d: Likewise for 2s, 1d: 2s, 2d: 2s, 3d: 2s, 4d. And so of al other, considering moreouer, many subtile abbreuiations, which happen oftentimes, that are easie to be conceiued. As thus 11s, 3d, after that I haue taken first the $\frac{1}{2}$ for 10s. Thē for 1s, 3d. I take the $\frac{1}{8}$ of ye product, because 1s, 3d, is the $\frac{1}{8}$ of 10s, in taking the sayd $\frac{1}{8}$ of the product. And by this meanes, when ye haue takē one product, ye may oftentimes vpon ye same take another more briefely than vpō the

the summe that is to bée multiplied, which thing you must forsée.

At 11 shil. 3 d.
What 53?

26	10	0
3	6	3.

29 lib. 16 shil. 3.

At 6 shil. 3 d.
What 58?

14	10	0
3	12	6

18 lib. 2 shil. 6 d.

At 12 shil. 8 d.
What 64?

32	0	0
6	8	0
2	2	8

40 lib. 10 shil. 8 d.

But if you will multiply by poũds shillings, & pence, being altogether. First you must wholly multiply by pounds,

pounds. then take for the shillings and pence, as in ŷ 6 rule of this chapter is plainely declared. And as by examples following may appeare.

At 3 lib. 6.8 d.
What 49?

147.	0	0.
16.	6	8.
163 lib.	6 shil.	8 d.

At 5 lib. 11 shil. 4 d.
What 543?

2715.	0.	0.
271.	10.	0.
135.	15.	0.
90.	10.	0.
3212 lib.	15 shil.	0 d.

At 2 lib. 7 shil. 4 d.
What 927?

1854.	0.	0.
185.	8.	0.
154.	10.	0.
2193 li.	18 shi.	0.

8.

So these rules do serue both to buy and sell. As at such a price the elle, the yard, the peece, the pound waight, or any other thing: how much is such a thing, or so many elles worth? Likewise they are very necessary to couert all peeces of gold & siluer into poūds: for I may aswell say, at 4 s. 8 d. the french crowne, what are 135 crowns worth, as to say at 4 s. 8 d. the yard of cloth, what are 135 yards worth.

When any one of the sums which is to be multiplied, is cōposed of many denominations: and the other being of one figure alone: then shall ye multiply all the denominations of the other summe, by the same one figure beginning first with that sum which is least in value towards your right hand, and bring the product of those pence into shillings, and the product of the shillings into pounds, as by this example doth appeare.

At 3 *li.* 9 *shi.* 8 *d. the peece.*
What 7?

24 *lib.* 7 *shi.* 8 *d.*

But

But (if any of the numbers which are to be multiplyed) there be with it a broken nūber, you must (according to his denominator) take one or many parts of the other nūber, as nœd doth require; & set the number which commeth thereof vnder the products adding the same together. As thus: At 5 li. 7 s̄. 8 d. the grosse, what shall 34 grosse ½ cost? First you shal multiply 5 li. 7 s̄ 8 d. by 34 grosse saying 5 times 34 do make 170 li. then for 6 s̄. 8 d take the ⅓ of 35, which is 11 li. 6 s̄ 8 d. Thirdly for 1 s̄. take 34 shil. which is 1 li 14 s̄.

At 5 li. 7 shil. 8 d.			
What 34 ½?			
	170 li.	0 shil.	0
	11	6	8
	1	14	3
	2	17	10
	185 li.	14 shi.	6 d.

Finally for ẏ ½ grosse, you must take ½ of ẏ 5 li. 7 s̄. 8 d. which is 2 li. 13 s. 10 d. And then adde your foure products together, so you shall find, that the 34 grosse ½ at 5 pound 7 shillings 8 pence

8 pence the grosse is worth 185 li. 14 s. 6 d as appeareth in the example aforesaid.

And as in the last example, you did for the ½ grosse, take halfe of the price (that one grosse was worth) & therefore because 1 grosse is worth 5 pond 7 shillings 8 pence: the ½ grosse must be worth halfe so much So likewise if you haue ⅓ of a grosse, or of any other thing, you must take the ⅓ of the price, that one grosse is worth And in like manner for the ¼ of any thing you shall take the ¼ of the price, also if you haue ⅔, take the ⅔ of the price that one is worth, & so of all other fractions, as by these examples following doth appeare.

At 4 *lib.* 6 *shil.* 8 *d.*
What 46 ½?

184	0	0
15	6	8
2	3	4
201 *li.*	10 *shil.*	0 *d.*

At

At 8 lib. 0 shil. 9 d.

What 54 $\frac{1}{3}$?

432	0	0
1	7	0
0	13	6
2	13	7

436 *lib.* 14 *shil.* 1 *d.*

At 3 lib. 16 shil. 8 d.

What 17 $\frac{3}{4}$?

51	0	0
8	10	0
5	13	4
1	18	4
0	19	2

68 *lib.* 00 *shil.* 10 *d.*

12 If you wil make the prowfe of these rules aforesaid, you must first abate the sum of money (yͤ the fraction of the multiplication doth import) from the totall summe. And divide the rest of the pounds of the said totall summe, by the whole multiplicãd, the fraction onely excepted. And

if any thing doe remaine after the division is made, that remaine shall be multiplyed by 20: and unto the product of that multiplication, you shall adde the shillings which remayned of the rest of the totall sum. Againe if any thing do remaine after the same division, you must multiply the same by 12, and unto the product ad the pence of the total summe that remained, if any be left. And thus if ye haue truely wrought, you shall find againe the higher sum of your question that is to say, the price that one grosse or any other thing is worth, whereof the question is demaunded.

Or otherwise reduce the remaine of the totall summe (the value of the money that the fraction is worth being first reduced) all into pence, in multiplying the pounds by 20, and the shillings by 12: adding thereunto, the shillings and pence, which are ioyned with the remaine of the sayd totall summe, if any such be, then divide those pence by the foresaid number

ber ẏ is to be multiplied, the fractiōs of the same number being also abated So shall you find the price that one péece, one grosse, or any other thing is valued at. As in the first of the 3 last exāples going before, where the tota sum is 101 pounds 10 shil. frō the which I do abate the price of the halfe grosse which is 2 li, 3 s, 4 d, ẏ rest is 99 li, 6 s, 8 d: which being reduced into pence bringeth 47840 d, I diuide the same by 46, & thereof commeth 1040 pence. Then I diuide ẏ 1040 pence, by 12 : and they bring 86 shillings 8 d, that is to say 4 li. 6 shillings 8 pence, which is the price that one grosse, or any other thing did cost, as in that first exemple doth appeare.

The like is to be done of any maner of thing that is sold by the hundred, after 5 score to the hundreth. As thus: at 12 pound, 7 shillings 6 d, the 100 pounds waight, what shall 374 pounds waight cost? you shall first multiply 12 poūds 7 shillings 6

pence, by 3: ÿ is to say, by thrée hundreth. Then for 50 li. waight you shall take the $\frac{1}{2}$ of 12 li. 7 s, 6 d, because 50 li. is the $\frac{1}{2}$ of 100 li. Likewise for 20 li. waight, which is the $\frac{1}{5}$ of 100 li. you shall take ÿ $\frac{1}{5}$ of 12 li, 7 s 6 d. lastly for 4 li, waight you must take the $\frac{1}{5}$ of ÿ last product.

At 12 *lib.* 7 *shil.* 6 *d.*
What 3 | 74?

37	2	6
6	3	9
2	9	6
0	9	10$\frac{4}{5}$

46 *lib.* 5 *shil.* 7 *d.* $\frac{4}{5}$

This done, you must ad al these products into one sum, which will make the summe of 46 li. 5 s, 7 d, $\frac{4}{5}$: as by this Example aboue writtē doth appeare.

The profe is made by reducing ÿ totall sum into pence. And so diuide the product by the nūber that is to be multiplied that is to say by 374, likewise diuide the quotient produced of that first Diuision by 12: so shal you find againe the higher summe 12 li, 7 s, 6 d, which is the price of a 100 li. waight

waight, as before.

Also the like may bée done of our vsuall waight here in England (which is 112 li. for euery hundred pound waight) in case you know the aliquot parts of a hũdred, ẏ is to say, of 112: li. waight, which are these, 56 li. 28 li. 14 li. & 7 li. For 56 li. is the $\frac{1}{2}$ of 112: 28 li. is the $\frac{1}{4}$ of 112 li. 14 li: is the $\frac{1}{8}$, and 7 li. is the $\frac{1}{16}$.

Therefore for 56 li. take the $\frac{1}{2}$ of the summe of monney, that the 112 pound waight is worth.

For 28 li take the $\frac{1}{4}$ of the sum of money that the 112 li is worth.

For 14 li. take the $\frac{1}{8}$ of the sum that the C is worth.

For 7 li. take the $\frac{1}{16}$ of the sum of money that the C. is worth.

As thus, at 3 li. 6 s, 8 d. ẏ hũdreth pounds waight, that is to say, ẏ 112 li. what shal 24 hundreth 3 quarters 21 li waight cost after the rate?

First, you shal multiply 24 hũdreth by 3, which is the 3 li and therof wil come 72 li then for 6 s, 8 d, which is

the $\frac{1}{3}$ of 10 s, you shall take the $\frac{1}{3}$ of 24, which is 8 li: for 24 Nobles, maketh 8 li. afterward, for the 3 quarters of ye C. you shall first for ye 56 li. take ye $\frac{1}{2}$ of 3 li, 6 s, 8 d. bicause 56 li, is ye $\frac{1}{2}$ of the C and

At 3 li. 6 sh. 8 d.		
What 24 C. 3 qui. 21 li		
72	0	0
8	0	0
1	13	4
	16	8
	8	4
	4	2
83 li. 2 sh. 6 d.		

therof commeth 1 li, 13 shil. 4 d. then for 28 li, (which is ye quarter of a C) you shall take the $\frac{1}{4}$ of 3 li, 6 s, 8 d, or els the $\frac{1}{2}$ of the product, which cometh last of 56 li, which is 16 s. 8 d, likewise for 14 li. you must take the $\frac{1}{8}$ of 3 l. 6 s. 8 d, which is 8 s, 4 d, or els the $\frac{1}{2}$ of ye product that cometh of 28 li. which is all one Finally for 7 li, take the $\frac{1}{16}$ of 3 li 6 s, 8 d, or els ye $\frac{1}{2}$ of ye last product that cometh of 14 li: & therof cometh 4 s, 2 d: Then add all these products together: and the totall summe wilbe 83 li: 2 s, 6 d, so much are ye 24

C. 3

C. 3 quarters, & 21 li. waight worth after 3 li. 6 s. 8 d the hundreth, as appeareth in the margent.

The proofe whereof is made, like to the other proofes aforesayd, sauing that wherein those proofes, you abate the price of the money, that the fraction was worth, from the totall sum. Here in this example (and in such other like) you must abate the price of ẏ money, that the odd waight amounteth vnto (ouer and aboue the iust hundreths) from the sayd totall sum: the rest thereof shal you conuert into pence, diuiding the product of ẏ multiplication by the iust number of the number of the hundreths, so shal you find the pence, that one hundreth is worth: which you shall bring into pounds by the order of diuision, and so of all other.

Chap. 2.

Of the rule of thred composed, the which is distinct into foure Rules, *each of them differing, the one from the other.*

There belongeth to the first and secōd parts of the Rule of thrée composed alwaies 5 nūbers: whereof (in the first part of the Rule of thrée composed) the second number & the fift, are alwaies of one semblance & like denominatiō: whose rule is thus. You must multiply the first number by the second and that shall be your diuisor, then multiply the other thrée numbers the one by the other to bée your diuidend.

Example of this first part, if 100 Crownes in 12 moneths, doe gaine 15 li. what will 60 Crowns gaine in 8 moneths? *Answ.* First multiply 100 Crowns by 12 moneths: & therof cōmeth 1200 for your diuisor, then multiply 15 li by 60 crownes, & by 8 moneths, and you shall haue 7200 wherfore diuide 7200 by 1200, and therof commeth 6 li. so many li. wil 60 crownes gaine in 8 moneths, this Question may be done by the double rule of 3, that is to say by ẏ rule of 3 at 2 times. But yet this rule of 3 cōposed

posed is more briefe.

Crowns.	*moneths.*	*poũds.*	*crow.*	*moneths.*
100.	12.	15.	60.	8.

1
~~7~~ ~~2~~|00
1 ~~2~~|00 (6 *lib.*

2 In the second part of the rule of three composed the third number is like unto the fift, whereof the rule is thus you must multiply the third nũber by the fourth, and the product shalbe your diuisor, then multiply the first number by the second, & the product thereof by the fift, the which nũber shalbe your diuidend, or number ỷ is to be diuided: as by example.

When 60 crowns in 8 moneths do gaine 6 li in how many months wil 100 crownes gaine 15 li. *Answere.* Multiply the third number 6 by the fourth number 100: and therof commeth 600: which shalbe your diuisor, then multiply the first nũber 60 by the second number 8 and the pro-

duct

duct therof by the fift number 15 and thereof will come 7200 : then diuide 7200, by 600, and the quotient will be 12 in so many, months will 100 crownes gaine 15 li. This question may likewise be done by the rule of 3 at 2 times.

Crowns.	*monthes.*	*poūds.*	*crowns.*	*poūds.*
60	8	6	100	15

1
7200 *monthes.*
600 (12

In the third part of the rule of 3. composed there may be 5 numbers, or more: and in this rule, ẏ first number and the last are alwaies dessemblant and of vnlike denomination, the one to the other: and the question is from the last nūber vnto the first, whereof the rule is thus, you must multiply that number which you would know by those numbers which do giue the value, & diuide ẏ product of the same by the multiplication of the numbers which

which are all ready valued, as by example. If 4 deniers Parisis be worth 5 deniers Tournois, and 10 deniers tournois, be worth 12 deniers of sauoy, I demaund how many deniers Parisis are 8 deniers of sauoy worth *Answ*: Multiply 8 deniers of sauoy (which is the number that you would know) by 4 deniers parisis, & by 10 deniers tournois which are the numbers ye giue ye value & they make 320: thẽ multiply 5 den. tournois, by 12 deniers of sauoy which are the nũbers already valued & they make 96: Finally diuide 320 by 60 & you shal find 5 deniers $\frac{1}{3}$ parisis so much are the 8 deniers of Sauoy worth.

Parisis. tournois, tournois, sauoy. sauoy,
4 *d*, 5 *d*, 10 *d*, 12 *d*. 8 *d*,

~~3~~2|0 *par.*
~~6~~|0 (5 *d*. $\frac{1}{3}$,

In the fourth part of the rule of 3 composed: the first number and the last

last are alwaies semblant and of one denomination, & the question of this rule, is alwaies from the last number to ẏ last sauing one, whereof there is a rule which is thus. You must multiply ẏ nũber which you would know, by the numbers that are already valued, & diuide the product of the same, by the multiplicatiõ which commeth of the numbers that giue the value, as by example.

If 4 deniers Parisis, be worth 5 deniers Tournois, & 10 deniers tournois, be worth 12 deniers of Sauoy: I demaund how many Deniers of Sauoy, are 15 deniers parisis worth? *Answ.* Multiply 15 Deniers Parisis ẏ you would know, by 5 deniers Tournois, & by 12 Deniers of Sauoy, which are the numbers already valued, and they make 900. Diuide the same by 4 times 10, which are ẏ nnmbers that doe giue the value, ẏ is to say, by 40, & you shall find 22 Deniers $\frac{1}{2}$ of Sauoy: so much are the 15 Deniers Parisis worth.

Parisis.	*tournois.*	*tournois.*	*Sauoy.*	*Pari.*
4 d.	5 d.	10 d.	12 d.	15 d.

12 |
~~660~~ *Sauoy.*

44|0 (22 d. $\frac{1}{2}$.

The Third Chapter treateth of Questions of the trade of Marchandize *in the which is taught the Rule of three in Fractions, beginning at the fifth Question following.*

If 31 Deuonsh. dozẽs, doe cost me 100 li. 15 shi. what shall 4 dozens cost after the same rate? *Answ.* first bring the 100 li. 15 shi. all into shillings, in multiplying the 100 li. by 20, and adding to the product the 15 shil and thereof commeth 2015 shil. then multiply 2015 by the third nũber 4, and diuide the product by 31, & ỹ quotient wilbe 260 s. The which diuide againe by 20, and therof commeth 13 li. And so much are the 4 dozens worth.

Dozens.

Dosens.	lib.	shil.	Dosens.
31	100	15	4

20

2015

4

8060

28

8060 (260

3111

33

If 4 dozens bée worth 13 li. what are 31 Dozens worth by the price? *Answ:* Multiply 31 by 13, & thereof commeth 403. The which you shall diuide by 4, and therof commeth 100 li. $\frac{3}{4}$ which $\frac{3}{4}$ are 15 s. and so much are 31 Dozens worth, as before.

Dosens.	lib.	Dosens.
4	13	31

13

93

31

403

403

444 (100 li. $\frac{3}{4}$.

3. If 49 ells be worth 2 li. 4 s. 11 d. what are 18 ells worth by the price? First you must bring 2 li. 4 s. 11 d. al into pence, in multiplying 2 li. by 20 maketh 40: adde thereto 4 shillings they make 44 s: the which multiply by 12 d. and they make 528 d. where vnto adde 11 d. all is 539 d. the which 539 d. must be your second number in the rule of three, then multiply 539 by the third number 18, and thereof commeth 9702, diuide the same by 49, & you shall haue in your quotient 198 d. the which diuide by 12, & you shall find 16 s. 5 pence: so much are the 18 elles worth.

Ells.	li.	shil.	d.	Ells.
49	2	4	11	18
	20			539
	44			18
	12			4312
	88			539
	441			
	1			
	539			9702

1 8	1
4 2 7	7 6
8 8 6	1 9 8 (16 shil. 6 d.
9 7 0 2 (198.	1 2 2
4 9 9 0	1
4 4	

4 If 18 elles be worth 16 s. 6 pence, what are 49 elles worth by the price? *Answe.* bring 16 shil. 6d, into pence in multiplying 16 by 12: and therof cōmeth 198d, with the 6d, added to it, thē multiply 198d, by 49 ye product wilbe 9702, The which diuide by 17 elles, and therof cōmeth 539d, Thē diuide 539d. then diuide 539 by 12, & the product therof by 20: So shall you haue 2 li, 4 shi: 11d, and so much are the 49 elles worth.

Elles.	*shil.*	*d.*	*Elles.*
18	16	6	49
	12		198
	32		392
	166		441
	198		49
			9702

```
 17              1
427             181
8702 (539       839 (44 shil.
1888            122
 11              1
```

Note that wheras in the first part of this booke, I haue set forth the rule of thrée both in whole numbers, and also in fractiõs: now I will shew you how to do the said Rule of thrée, in fractiõs more at large. And therfore, for yͭ I wold haue you to vnderstãd yͤ same generally you must first cõsider if the thrée numbers that shalbe proponed (in any question of the sayd rule of thrée) be all fractions yea are no? which if they be all thrée nũbers fractions: then must you worke as followeth.

First you must multiply the numeratours, of yͤ second and third fractions in your rule of thrée, the one by the other, and againe you must multiply that product, by the denomina-

tor of the first fraction: and the number which commeth of this last multiplycation, shall be your diuidend, or number that must be diuided.

Secondly you must multiply likewise the denominators of the second and third fractions in your sayd Rule of thrée, the one by the other, and the of come againe by the numerator of the first fractiō. And ẏ number which is produced of that multiplycation, shall be your diuisor.

Thirdly, you must diuide the aforesayd diuidend by the diuisor, and the quotient will bée the answere to the question, as by Examples shall hereafter appeare.

But if you find whole numbers and fractions together, in the said Rule of thrée: you must first reduce the same into their fractiōs by the 6 reduction.

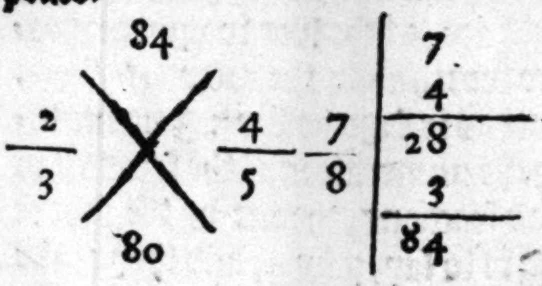
Likewise if you finde any of the

thrée numbers in your rule of thrée, to be whole nūbers, alone without any fraction ioyned with it, you must in this case put 1 vnder the same whole number with a line betwéene them both: The which 1 doth represent the denominator to the same whole nū- ber, & then you must procéed to work the Rule of thrée in like manner, as though they were all fractions: as before is sayd.

The Examples of all three differen- ces aforesaid, doe follow in the *three next questions orderly.*

If $\frac{2}{3} \times \frac{4}{5}$ $\frac{7}{8}$: I do vnderstand thereby thus as followeth. If $\frac{2}{3}$ of any waight, or measure be worth $\frac{4}{5}$ of twenty shil. or of any other sum, what are $\frac{7}{8}$ of the like waight or mea- sure worth after the rate? *Answere.* First as is sayd before: I do multi- ply the numerators of the second and third fractions, the one by the other: that is to say, 7 by 4, and they make

28: againe, I do multiply the said 28 by the denominator of the first fraction, that is to say by 3, and thereof commeth 84 the which 84 I set ouer the crosse for my diuidend Secondly, I doe multiply the denominators of the second and third fractions the one by the other. Namely 8 by 5 and they make 40: againe I do multiply ỹ said 40 by the numerator of the first fraction : that is to say by 2, and thereof cōmeth 80, the same 80 I do set vnder the crosse for my diuisor. Then I diuide 84 by 80, and there cōmeth in the quotient 1 li. and $\frac{4}{80}$ remaining, ỹ which $\frac{4}{80}$ béeing abbreuied, maketh $\frac{1}{20}$ of a pound, which is worth 12 d. And so much will the aforesaid $\frac{7}{8}$ cost, as by the worke followeth doth appeare.



8
5
40
2
80

~~84~~ (1 $\frac{4}{10}$.
~~80~~

5. If $\frac{2}{5}$ of an ell, of any marchandize do cost me 12 shil. 7 d the which 7 d. doth make $\frac{7}{12}$: what wil $\frac{49}{10}$ of an ell cost me after the same rate? *Answe.* First I set down my nũbers as followeth. If $\frac{2}{5}$ × 12 $\frac{7}{12}$. $\frac{9}{10}$. Then by the 6 reduction I reduce 12 $\frac{7}{12}$ all into twelues, and they make $\frac{151}{12}$ for the second nũber in my rule of thrée. which must stand in ẏ place of 12 $\frac{7}{12}$. And then will my 3 numbers stand thus as followeth $\frac{2}{5}$ × $\frac{151}{12}$. $\frac{9}{10}$. Then I multiply 151 by 9, & therof come by 5, and therof cõmeth 6795, the which I do set ouer the crosse for my diuided Likewise I multiply 12 by 10, and therof come by 2, and therof conimeth 240: which I do set vnder ẏ crosse for my diuisor. Thẽ I diuide 6795, by 240: and there cometh

 in

in the quotient 28 shillings, and 75 remaining the which 75 because it is the remaine of shi. I do multiply it by 12 pence, for that there is 12 pennies in a shil. and therof cōmeth 900. The same 900, I diuide againe by 240, & therof commeth 3 pence, and 180 remayning, which 180 I do set apart ouer 240, with a line betweene them both, & they are $\frac{180}{240}$. The which being abbreuied, do make $\frac{3}{4}$ of a penny. And thus I find that the $\frac{9}{10}$ of an elle shall cost 28 s, 3 d. $\frac{3}{4}$, as hereafter doth appeare.

151	12		6795	$\frac{151}{12}$	$\frac{9}{10}$
12 — 7	12				
12	24	$\frac{2}{5}$			
	127				
	151		240		

151	12	12	
9	10	297	
1359	120	67958	(28 shil.
5	2	2400	
6795	240	24	

75	1
12	38
150	900 (3 d. $\frac{180}{240}$.
75	240
900	$\frac{3}{4}$.

7 If $\frac{3}{5}$ of an elle doe cost me 8 shillings, what will 7 elles $\frac{1}{2}$ cost me affther the rate? *Answere.* I doe first reduce the whole number and broken into his broken by the first Reduction, that is to say 7 $\frac{1}{2}$ into halfes, and they are $\frac{15}{2}$, which must be the third number in my rule of three, the second nũber is 8 shil. but I must (as before is taught) put 1 vnder 8 with a line betweene them, to make it like a fraction thus, $\frac{8}{1}$ Then must my three nũbers in my Rule of three, stand after this manner: $\frac{3}{5} \times \frac{8}{1}$. $\frac{15}{2}$. Then I doe multiply 15 by 8, & the product thereof by 5, amoũteth 600: The which I do set ouer the crosse, for my diuidend Likewise I doe multiply 2 by 1, and the product thereof by 3, and thereof commeth 6, the which I do set vnder

the crosse for my diuisor. Then I diuide 600 by 6, and I find in my quotient 100: the which is 100 shillings: I do therfore diuide 100 by 20 shil, & my quotient is 5 li. And so much wil the 7 elles ½ cost me, as hereafter doth appeare.

$$7\tfrac{1}{2}\ \left|\ \begin{array}{r} 7 \\ 2 \\ \hline 14 \\ 1 \\ \hline 15 \end{array}\ \right|\ \frac{3}{5}\ \overset{600}{\underset{6}{\times}}\ \frac{8}{1} \qquad \frac{15}{2}$$

$$\begin{array}{r} 15 \\ 8 \\ \hline 120 \\ 5 \\ \hline 600 \end{array}\ \left|\ \begin{array}{c} 2 \\ \frac{1}{2} \\ \frac{3}{6} \end{array}\ \right|\ \begin{array}{c} \cancel{6}\cancel{0}\cancel{0} \\ \cancel{6}\cancel{6}\cancel{6} \end{array}\ (100\ \text{sh.}\ \left|\ \begin{array}{c} 1\cancel{0}0 \\ 2\cancel{0} \end{array}\right.(5\ \text{li.}$$

If 1 yard of Veluet cost 19 shil. what shall ¾ of a yard cost? *Answe.* sette downe your numbers thus. If $\frac{1}{1} \times \frac{19}{1}$. Thē multiply 1 times 19, by 3: and thereof commeth 57 for

your

your diuidend, or number to be diuided The which 57 you shall diuide by 1 times 1, 4 times, which are 4, & your quotient wil be 14 s. $\frac{1}{4}$, which $\frac{1}{4}$ is worth 3 d. so much are the $\frac{3}{4}$ of a yarde worth after 19 shil, the yarde, as by practise followeth.

57

$\frac{1}{1}$	X	$\frac{19}{1}$	$\frac{3}{4}$	1 1 / 8 7 / 4 4	(14 *shil.* $\frac{1}{4}$

4

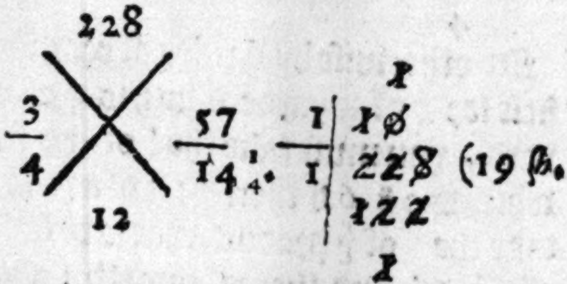
Or otherwise by ye rules of practise: first for $\frac{2}{4}$ of a yarde which is $\frac{1}{2}$ of a yard, you must take the $\frac{1}{2}$ of 19 s. which is 9 s. 6 d then for $\frac{1}{4}$ of a yard, take the $\frac{1}{2}$ of ye product, that is to say, of 9 s. 6 d. and thereof commeth 4 s. 9 d. adde these numbers together, and you shall haue 14 s. 3 d as aboue is sayd, and as appeareth heere in ye margent.

19 *shil.*	
9 *shil.*	6 *d.*
4	9.
14	3.

9. If $\frac{3}{4}$ of a yard

of

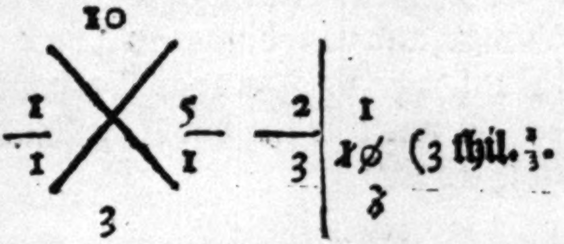
of Veluet doe coſt 14 ſhil. 3 d what ſhall 1 yard coſt? *Anſw.* Set your nūbers down thus: if $\frac{3}{4}$ × 14 $\frac{1}{4}$. $\frac{1}{1}$. Reduce 14 $\frac{1}{4}$ into a fraction, and they will be $\frac{57}{4}$, then multiply 57 by 1, 4 times, and thereof commeth 228 for your diuidend. Likewiſe multiply 1 times 4, 3 times, and thereof cōmeth 12 for your diuiſor: then diuide 228 by 12, and your quotient wilbe 19 s. ſo much is the yard of Veluet worth.



Or otherwiſe by the Rule of practiſe: you ſhall take the $\frac{1}{3}$ part of 14 ſhil. 3 d. which is 4 s. 9 d. and adde it with the ſame 14 ſhil. 3 d. and you ſhall haue 19 ſhil. as before.

14 *shil.*	3 *d.*
4	9
19 *shil.*	0 *d.*

10 If one elle of Holland cloath be worth 5 s, what are $\frac{2}{3}$ worth after the rate? *Ans.* Say thus, if $\frac{1}{1} \times \frac{5}{1}$ $\frac{2}{3}$ Then multiply 2 times 5, one time, & thereof commeth 10 for your dividend: likewise multiply 3 times 1 one time they make 3 for your divisor, then divide 10 by 3, & thereof commeth 3 s. $\frac{1}{3}$ which $\frac{1}{3}$ is worth 4 d, and so much are the $\frac{2}{3}$ of an elle worth.



Or otherwise, by the rule of practise: take first the $\frac{1}{3}$ of 5 s, for ye $\frac{1}{3}$ of an ell, and that is 1 s. 8 d. Likewise, for the other

other $\frac{1}{3}$ of an elle, take again another $\frac{2}{3}$ of 5 s, which is also 1 shilling 8 d. and adde them together, and so shall you haue 3 s. 4 d. as before.

5 shil.	
1	8
1	8
3 shil.	*4 d.*

11 If $\frac{2}{3}$ of an elle of Holland cloth doe coste me 3 s, 4 d, what shal 1 elle cost? *Answ.* set downe your numbers thus: if $\frac{2}{3} \times 3\frac{1}{3}$. $\frac{1}{1}$. First reduce $3\frac{1}{3}$ all into thirds, and it wilbe $\frac{10}{3}$. Thē multiply 1 times 10, 3 times, and therof commeth 30 for your diuidend. Likewise multiply 1 times 3, 2 times, and your diuisor will be 6: thē diuide 30 by 6, and you shal haue 5 s. so much is the elle of Holland cloth worth.

$$\begin{array}{ccccc} & 30 & & & \\ \frac{2}{3} & \times & \frac{10}{3\frac{1}{3}} & \frac{1}{1} & \frac{\cancel{30}}{\cancel{6}} \ (5 \text{ shil.} \\ & 6 & & & \end{array}$$

Or otherwise by practise, take the $\frac{1}{2}$ of 3 s, 4 d. which is 1 shilling 8 pence, and adde it to the same 3 shillings 4 d. and thereof will come 5 s, as before. For the $\frac{1}{3}$ 5 s, is as much as the $\frac{1}{2}$ of 3 s, 4 d, which was the price that the $\frac{2}{3}$ of an elle did cost, as appeareth.

3 *shil.*	4 *d.*
1	8
5 *shil.*	0 *d.*

12 If one elle cost me 17 s. what shal 15 elles $\frac{1}{8}$ part cost? which $\frac{1}{8}$ is halfe a quarter of an elle. *Answ.* say if $\frac{1}{2} \times \frac{17}{1}$. 15 $\frac{1}{8}$. First reduce 15 $\frac{1}{8}$ into eight parts, & they make $\frac{121}{8}$ then multiply 121 by 17, 1 time, & thereof commeth 2057, for your dividend. Likewise multiply 8 times 1, 1 time, and the product wilbe 8, for your divisor, then divide 2057, by 8, and you shall find 257 shil: $\frac{1}{8}$, which is 12 li, 17 s, 1 d, $\frac{1}{2}$ & so much are the 15 elles $\frac{1}{8}$ worth, as by practise doth appeare in the page following.

$\frac{1}{1}$ X $\frac{17}{1}$ $\frac{121}{15\frac{1}{8}}$

Or otherwise, for 10 s. take the $\frac{1}{2}$ of 15, which is 7 li. 10 s. thē for 5 s. take the $\frac{1}{2}$ of 7 li. 10 s. which is 3 li. 15 s. thirdly for 2 s take the $\frac{1}{5}$ of 7 li, 10 s. because ỹ $\frac{1}{5}$ of 10 s, is 2 s. Fourthly for ỹ $\frac{1}{8}$ of ỹ elle, you shall take the $\frac{1}{8}$ of 17 s, which is 2 shil. 1 d: $\frac{1}{2}$. Then adde all these sums together, and you shall find 12 li. 17 s, 1 d, $\frac{1}{2}$. as before, and as appeareth more plainly in the former practise.

15 $\frac{1}{8}$		
17		
7	10	0
3	15	0
1	10	0
	2	1 $\frac{1}{2}$.
12 *li.*	17 *shil.*	1 *d.* $\frac{1}{2}$.

13 If 25 elles be worth 2 li, 3 s, 4 d, what are 18 elles $\frac{3}{4}$ worth by ỹ price? *Answere.* First put 3 s, 4 d, into the part of a li, and you shall haue $\frac{1}{6}$: then say, if $\frac{25}{1}$ giue me 2 li, $\frac{1}{6}$, what shal 18 $\frac{3}{4}$ giue?

$\frac{3}{4}$ giue: put the whole numbers 6 into their broken, and then multiply 1 times 13 by 75, the product will bee 975, the which you shal diuide by 25 times 6, 4 times: which maketh 600. Then diuide 975 by 600: and your quotient will be 1 li, and 375 wil remaine, the which 375 you shall multiply by 20, & therof will come 7500 diuide the same by 600, your quotiēt will be 12 s, and 300 wil remain, the which abreuied is $\frac{1}{2}$ which is 6d: thus the 18 elles $\frac{3}{4}$ are worth 1 li, 12 s, 6 d, as by practise will appeare.

$$\frac{13}{\frac{25}{1}} \times 2\tfrac{1}{6} \qquad \frac{75}{18\frac{3}{4}}.$$

Or otherwise by the rules of practise, for because that 12 elles $\frac{1}{2}$ is the $\frac{1}{2}$ of 25 elles, therfore take the $\frac{1}{2}$ of 2 li, 3 s, 4 d, which is 1 li, 1 s, 8 d, thē for 6 ells $\frac{1}{4}$ take the $\frac{1}{4}$ of 2 li, 3 s, 4 d, or else the $\frac{1}{2}$ of the last product, (that is to say, of 1 li, 1 s, 8 d) which is all one, & adde them together, so shall you haue 1 li, 12 s, 6 d, as before.

lib.	shil.	d.
2	3	4
1	1	8
	10	10
1 lib.	12 shil.	6 d.

14 If 15 yards be worth 32 s. what are halfe a yard and halfe a quarter, or els $\frac{5}{8}$ of a yard worth? *Answere*, say if $\frac{15}{1}$ giue $\frac{32}{1}$ what will $\frac{5}{8}$ giue? Multiply 1 times 32 by 5, and diuide the product by 15 times 8 times, and your quotiēt wilbe 1: and $\frac{40}{120}$ remaining, which is $\frac{1}{3}$ of a shil. that is to say 4 d. and so much are the $\frac{5}{8}$ of a yard worth, that is to say 1 s. 4 d.

$$\frac{15}{1} \times \frac{32}{1} \quad \frac{5}{8}.$$

Or otherwise, see what the yard is worth after the maner aforesaid in ẏ other examples, and you shall find that the yard is worth 2 s, 1 d, $\frac{3}{5}$: of the which number take first the $\frac{1}{2}$ for $\frac{4}{8}$, which is 1 s, 0 d, $\frac{4}{5}$, of the which number, take the $\frac{1}{4}$ for the other $\frac{1}{8}$, which

which is 3 d. $\frac{1}{5}$ adde these two numbers together, and you shal find the $\frac{5}{8}$ to be worth 1 s, 4 d. as before is said.

2 shil.	1 d.	$\frac{3}{5}$
1	0	$\frac{4}{5}$
	3	$\frac{1}{5}$
1 shil.	4 d.	0

15 If 13 elles $\frac{5}{6}$ be worth 27 shi. what are 10 ells $\frac{2}{3}$ worth by ye price? *Answe.* Say if 13 $\frac{5}{6}$ giue $\frac{27}{1}$, what shall 10 $\frac{2}{3}$ giue? put the whole numbers into their broken, and you shall finde $\frac{83}{6}$, $\frac{27}{1}$, and $\frac{32}{3}$. Then multiply 6 times 27, by 32, and thereof cometh 5184, the which number you shall diuide by 83 times 1, 3 times & you shall find 20 shil. $\frac{68}{83}$, which fraction is worth 8 d. $\frac{69}{83}$ parts of a peny.

$$\frac{83}{13\frac{5}{6}} \times \frac{27}{1} \quad \frac{32}{10\frac{2}{3}}$$

16 If 2 yards $\frac{1}{2}$ be worth 4 s. 8 d. what are 8 yards $\frac{1}{4}$ worth? *Answere.*

put the 8 d. into the part of a shilling setting 8 ouer 12, & it wil be $\frac{8}{12}$ which abbreuied are $\frac{2}{3}$, thē reduce the whole numbers into thrée broken, and they wil stand thus: $\frac{5}{2}$, $\frac{14}{3}$, $\frac{33}{4}$, thē multiply 2 times 14 by 33, and diuide the product by 5 times 3.4 times, & you shal find 15 s and $\frac{24}{60}$ will remain which are worth 4 d, $\frac{4}{5}$, so much are the 8 yards $\frac{8}{4}$ worth.

5	14	33
$2\frac{1}{2}$	$4\frac{1}{3}$	$8\frac{1}{4}$

17 If 1 Kersey be worth 2 li, 6 s 8 d, how many Kerseis shal I buy for 36 li. 3 s, 4 d. after the rate? *Answe.* put 6 s, 8 d, into the part of a li and you shall haue 2 li. $\frac{1}{3}$, for the first number in the rule of 3, and 1 kersey for ẏ second number: then put 3 s : 4 d. into the part of a li and it is $\frac{1}{6}$, so you shal haue 36 li $\frac{1}{6}$ for the third nūber, thē wil your 3 numbers in the rule of 3, stand thus. $2\frac{1}{4} \times \frac{1}{1}$. $36\frac{1}{6}$. Then reduce the whole numbers into their bro-

broken, & it wilbe thus, $\frac{7}{3} \times \frac{1}{1} = \frac{217}{6}$. Then multiply 3 times 1 by 217, & thereof will come 651 for your diuidend. Likewise multiply 7 times 1 by 6: and the product thereof will bee 42. Then diuide 651 by 42, and you shall find 15 $\frac{8}{2}$: So many kerseys of 2 li. 6s 8d. the peece, shall you haue for 36 li. 3s. 4d.

$$\frac{7}{2\frac{1}{3}} \times \frac{1}{1} \quad \frac{217}{36\frac{1}{6}}.$$

Chap. 4

Of losses and gaines, in the trade of *Marchandize*.

1 IF 13 yardes $\frac{1}{3}$ bee worth 22 li. 10 s. how shall I sell 1 yarde to gaine $\frac{1}{3}$, or to make 3 4: which is all one, *Answ.* Say by the rule of three, if 3 do yeeld 4. What will 22 $\frac{1}{2}$ yeeld: multiply & diuide & you shall find 30 li. Then say againe by the rule of 3, if 13 yards $\frac{1}{3}$ doe giue 32 li. as well of principall as of gaine: what will

1 yard be worth by the price? Multiply and diuide, and you shall find 2 li. 5 s̄, & for that price must the yard be sold to gaine the $\frac{1}{3}$, or to make of 3, 4.

180
———
$\frac{3}{1} \times \frac{4}{1}$
———
6

45 | 1~~8~~~~0~~ (30
22 $\frac{1}{2}$ | ~~8~~~~8~~

90
———
40
———
13 $\frac{1}{3}$ $\times$ $\frac{20}{1}$
———
40

Or otherwise, take the $\frac{1}{3}$ part of 22 li. 10 s. which is 7 li. 10 s. that shall you adde with 22 li. 10 s. & you shall haue 30 li. as before. Then diuide 30 by 13 $\frac{1}{3}$, and you shall find 2 li. 5 s. as aboue is sayd.

li.	sh.
22	10
7	10
30	00

2. If one yard be worth 27 s, 6 d.

for

for how much shall 16 yards $\frac{2}{3}$ be sold to gaine 2 s. vpon the li, of money? that is to say, vpon 20 s? *Answe.* Ad 2 s, vnto 20, and you shall haue 22, then say: If 20 s, principall doe giue 22 s, principall and gaine: how much will 27 s, 6 d, principall yeeld? Multiply and diuide, and you shall find 30 s, $\frac{1}{4}$: then say againe by the rule of 3. If 1 yard doe giue me 30 s, $\frac{1}{4}$ (which is aswell the principall as the gaine) what shall 16 yards $\frac{2}{3}$ giue me? Multiply and diuide, and you shall finde 25 li, 4 s, 2 d. For ye same price shall the 16 yards $\frac{2}{3}$ be sold to gaine after the rate of 2 s, vpon the pound of money, or vpon 20 s, which is all one.

$$\frac{20}{1} \times \frac{22}{1} \quad \overline{55} \; 27\tfrac{1}{2} \quad \Big| \quad \frac{1}{1} \times 30\tfrac{1}{4} \quad 121 \quad 50 \quad 16\tfrac{2}{3}$$

3 If 10 yards $\frac{2}{3}$ be worth 25 li, 10 s, for how much shall 2 yards $\frac{1}{4}$ bee sould, to gaine after 10 li. vpon ye 100 li, of money? *Answe.* say if 100 principall yeeld 110, as well principal as

 gaine,

gaine how much will 25 li, 10 shil. yeeld me? Multiply & diuide and you shall find 28 li, 1 s. Then say, if 10 yards $\frac{2}{3}$ do yeeld me 28 li, 1 s, as wel principall as gaine, how much shal 2 $\frac{1}{4}$ yeld me? Multiply and diuide and you shall find 5 li, 18 s, 4 d, $\frac{1}{12}$, and for so much shal the 2 yards $\frac{1}{4}$ be sold, to gaine after 10 li, vpon the 100 li. of money.

$$\frac{200}{2} \times \frac{220}{2} \quad \frac{51}{25\frac{1}{2}}$$

$$\frac{32}{10\frac{2}{3}} \times \frac{561}{28\frac{1}{20}} \quad \frac{9}{2\frac{1}{4}}.$$

And although that in these questions of gaine and losse, sometimes ye first nūber is not like vnto the third number, that is to say, of the same denomination: for whereas one would say: if 20 s, gaine 2 s, what shall 50 l. gaine? or what shall 25 li, gaine &c. Or if 20 li, do gaine 2 li. what shall 25 shil. gaine? or what shall 27 shil. $\frac{1}{2}$ gaine?

gaine: Yet the same doth not proue that the rule is therfore false. For if 20s, do gaine 2s, 20 li shall gaine 2 li, and 20 d, shal gain 2 d likewise 20 crownes, shall gaine 2 crownes and so of al other. Therfore it is to be vnderstood, that the first number of the rule of three in these reasons, is purposed to bee semblable or like to the third in quality or name.

When one Marchant selleth wares to another, and he giueth to the buyer 2 vpon 15: how much shal ẏ buyer gaine vpon the 100, after the rate?

Answ. First adde 2 vnto 15, & they are 17, then say if 15 giue 17, what shall 100 giue? Multiply and diuide and you shall find 113 $\frac{1}{3}$ so the buyer getteth after the rate of 13 $\frac{1}{3}$ vpon ẏ 100.

15 | 17 | 100:

4 If one northen dozen cost me 3 li, 5 s, I sell ẏ same again for 3 li, 12 s, 6 d: how much doe I gain vpon the pound of monney after the rate? *An.*

Say if 3 ri. $\frac{1}{4}$ do giue 3 ri. $\frac{5}{8}$ what shal $\frac{20}{1}$ giue: put the whole number into their broké & you shal haue $\frac{13}{4} \times \frac{29}{8}$ $\frac{20}{1}$ then multiply 4 times 29, by 20: & therof commeth 2320: for your number ỹ is to be diuided, likewise multiply 13 times 8, 1 time: and thereof cōmeth 104. Then diuide 2320, by 104 and you shall find 22s, $\frac{4}{13}$. So I shall get 2s. $\frac{4}{13}$ vpon 20 s. or vpon the pound of monney.

$$\frac{13}{3\frac{1}{4}} \times \frac{29}{3\frac{5}{8}} \quad \frac{20}{1}$$

5. If a yard of cloth cost me 7s. 8d. and afterward I sel of the same cloth 13 yards $\frac{1}{4}$ for 4 li. 13 s 4d. I would know whether I do win or lose, and how much vpon the 100 li. of money? *Answ.* Sée first at 7s. 8 d. the yard what the 13 yards $\frac{1}{4}$ shall cost, and you shall find 5 li. 1 s. 7d. And I sold the same but for 4 li. 13 s. 4 d so that I do lose vpon ỹ 13 yards $\frac{1}{4}$, the sum of 8s, 3 d. Thē if you wil know how much

much is lost in the 100: Say by the rule of thrée, if 5 li. 1 s, 7 d, do lose 8 s, 3 d, what will 100 li. lose? First, put 1 s, 7 d, into the part of a li, and it will be $\frac{12}{240}$. Likewise put 8 s, 3 d, into the part of a li & it is $\frac{33}{80}$. Then will your nūbers stand thus: 5 $\frac{12}{240}$ × $\frac{33}{80}$ $\frac{100}{1}$ reduce the whole into his broken, & then multiply and diuide, so you shal find 8 li $\frac{7184}{9752}$ which fraction is worth 2 shil. 5 d, $\frac{769}{1219}$, and so much is lost in the 100 li. of money.

$$\frac{1219}{5\ \frac{19}{240}} \times \frac{\frac{33}{80}}{\frac{100}{1}}$$

6. More, if 12 yards $\frac{1}{2}$ of scarlet, be sold for 30 li. 15 s, vpon the which is gained after the rate of 11 $\frac{1}{9}$ vpon the 100: I demaund what the yard did cost at the first? *Answe.* from 30 li 15 s substract his $\frac{1}{10}$ part which is 3 li, 1 s 6 d, and there resteth 27 li, 13 s, 6 d, the which number multiplied by 2 bringeth 55 li, 7 s, of the which number take the $\frac{1}{25}$, which is 2 li. 1 s.

and

and 4 d, & $\frac{4}{5}$. Then take againe the $\frac{1}{5}$. of the sayd 11 pound, 1 shilling, 4 d, $\frac{4}{5}$, which is 2 li, 4 shillings three pence $\frac{9}{25}$. And so much did the yarde cost at the first penny.

30 *lib.*	15 *shil.*	0 *d.*
3	1	6
27	13	6
2	0	0
55	7	0
11	1	4 $\frac{4}{5}$.
2 *lib.*	4 *shil.*	3 *d.* $\frac{9}{25}$.

7. More, if 15 yards $\frac{3}{4}$ of a scarlet, doe cost me 32 li, 13 s, 4 d. And I sel the yarde againe for 2 li whether do I winne or lose, and how much in or vpon the pound of monney.

Answ. Looke what the 14 yards $\frac{3}{4}$ are worth at 2 li. the yard, and you shall find that they are worth 31 li. 10 s. But they did cost 32 li. 13 s, 4 d so that there is lost vppon the whole, 1 li. 3 s, 4 d. Then to knowe how much

much is lost in the li. Say by the rule of three, if 32 li, $\frac{2}{3}$ do lose 1 li, $\frac{1}{6}$, what will $\frac{1}{1}$ lose? that is to say, what will 1 li, lose? reduce the whole numbers into their broken, and then multiply & divide, so shall you find $\frac{21}{588}$ part of a li. Then multiply 21 by 240 d, because so many pence are in a li, and divide the product by 588, & you shall find 8 d, $\frac{336}{588}$. which being abbreuied, doe make $\frac{4}{7}$, and thus you see, that 8 d. $\frac{4}{7}$ is lost in the li, of monney.

$$\frac{98}{32\frac{2}{3}} \times \frac{7}{1\frac{1}{6}.\quad \frac{1}{1}.}$$

8 If 1 yarde of cloth of tissue, bee sould for 3 li, 15 s, whereupon is lost after the rate of 10 d in the 100: I demaund what 12 yards $\frac{1}{2}$ of the same tissue did cost? *Answ.* Adde unto 3 li, 15 s, his owne $\frac{1}{10}$ part, which is 7 s, 6 d, and all amounteth to 4 li, 2 s, 6 d, then looke what the 12 yardes $\frac{1}{2}$, will amount unto, after 4 li. 2 s, 6 d, and you shal find that they wil come

to

to 51 li. 11 s. 3 d. so much did the 12 yards ½ cost.

			12.	½.	
3 li. 15 shi. 0 d.			4 li.	2 shi.	6 d.
7	6		48	00	0
4 li.	2 shi.	6 d.	1	10	0
			2	01	3
			51 li.	11 shi.	3 d.

9. More, if I sell one Wilshire white for 6 li. 12 s. wherupon I doe gaine after ye rate of 2 s, upon the li, of money: that is to say, upon 20 s. I demaund what 11 peeces of the same whites did cost me? *Answere*: from 6 li. 12 s. (which is 132 s.) you shall subtract his $\frac{1}{11}$ part, that is to say, 12 s. and there will remaine 120 s. or 6 li. Then see at 6 li. the cloth, what the 11 clothes are worth, and you shall find that they are worth 66 li. And so much did the 11 clothes cost.

132 shil.	11
12 shil.	6
120 shil.	66 li.

10 If I sell 10 elles $\frac{1}{2}$ of Holland for 22s, 9d. wherupon I do lose after the rate of 2s, in the li, of mony. I demaund what the elle did cost me? *Answe.* say by the rule of thrée, if 18 s. giue 20s, what will 22 s. 6d. giue? Multiply and diuide, and you shall find 25s. Then diuide 25s, by 10 $\frac{1}{2}$: and thereof commeth 2s, 4d, $\frac{4}{7}$. So much did the elle cost.

$\frac{10}{1} \times \frac{21}{2}$. 22 $\frac{1}{2}$.

11 If I sell one cloth for 5 li, where vppon I doe lose after 10 in the 100. I demaund how much I shoulde lose or gaine, in the 100, if in case I had sold the same for 5 li. 10 shil. *Answe.* Say if 90 yéeld 100, how much wil 5 li, giue? Multiply & diuide & you shal find 5 li, $\frac{5}{9}$. Then say againe by ẏ rule of thrée, if $\frac{5}{9}$ come to 5 $\frac{1}{2}$, what will 100 come to? Multiply & diuide & you shall find 99 li, which béeing subtracted from a 100, there wil remaine 1 li, & so much is lost in ẏ 100.

The

Chap. 5

Of lengths and breadthes of Tapistrie, *and other clothes.*

1 If a péece of Tapistrie bée 5 elles $\frac{3}{4}$ longe, and 4 elles $\frac{2}{3}$ in bredth, how many elles square doth the same peece containe? *Answere.* Multiply the length by the breadth, that is to say 5 $\frac{3}{4}$ by 4 $\frac{2}{3}$, and thereof will come 26 elles, $\frac{5}{6}$, so many elles square doth the same péece containe.

2 More, if a péece of tapistrie doe cõtaine 32 elles square, & the same being in length 6 elles $\frac{1}{4}$. I demaund how many elles in bredth the same péece doth containe? *Answere.* diuide 32 elles by 6 $\frac{1}{4}$, and thereof commeth 5 $\frac{3}{25}$. So many elles doth the same péece containe in breadth.

3 More, a péece of cloth béeing 13 yards $\frac{1}{3}$ in length, and 5 quarters $\frac{1}{2}$ a quarter in bredth, how many yards of $\frac{2}{3}$ and $\frac{1}{2}$ of one third broad, will the same

same péece make? *Answere.* Sée first by ye 5 Reduction what part of a yard the $\frac{5}{4}$ and $\frac{1}{2}$ quarter bée, and you shall find that they make $\frac{11}{8}$, which is 1 yard $\frac{3}{8}$. Then multiply 13 yardes $\frac{1}{3}$ by 1 yard $\frac{3}{8}$, & you shall haue 18 yards $\frac{1}{3}$ in square, ye which you must diuide by $\frac{2}{3}$ & $\frac{1}{2}$ being reduced into one fraction by the fift Reduction: that is to say, by $\frac{5}{6}$ (because ye $\frac{2}{3}$, $\frac{1}{2}$ being brought into one fraction maketh $\frac{5}{6}$) and you shall find 22 yards. So many yards of $\frac{2}{3}$ and $\frac{1}{2}$ broade doth the same péece containe.

4 More, a Marchant hath bought 4 yards $\frac{2}{3}$ of cloth, béeing sixe quarters and half one quarter broad, to make him a gowne, the which he will line throughout with black Say of $\frac{3}{4}$ of a yarde broade. I demaund how much Say ye must buy? *Answ.* Multiply the length of the cloth by the breadth, that is to say 4 $\frac{2}{3}$, by 1 $\frac{5}{8}$ (which is the sixe quarters $\frac{1}{2}$ a quarters) and thereof commeth 7 yards $\frac{7}{12}$, the which diuide

uide by $\frac{3}{4}$, and you shall find 10 yards $\frac{1}{9}$. So many yards of Say must hee haue to line ye same 4 yards $\frac{2}{3}$ of cloth being of 6 quarters, and $\frac{1}{2}$ a quarter broade.

5 More, at 6 s. 8 d. the elle square what shall a peece of Tapistrie coste me, which is 5 elles $\frac{1}{2}$ long, and 4 ells $\frac{1}{4}$ broad? *Answe.* Multiply 5 $\frac{1}{2}$ by 4 $\frac{1}{4}$, & thereof commeth 23 ells $\frac{3}{8}$ square: then say by the rule of three if 1 elle square cost me 6s 8d. what shall 23 $\frac{3}{8}$ ells cost? Multiply and diuide & you shall find 7 li. 15 s. 10 d. so much the said peece of Tapistry did cost.

Or otherwise by the Rules of practise, take the $\frac{1}{3}$ of 23 $\frac{3}{8}$: and you shall find 7 li. 15 s. 10. as aboue is said.

6 More a peece of Holland cloth containing 42 elles $\frac{2}{3}$ Flemish, how many elles English doe they make? Heere you must first note, that 100 elles Flemmish do make but 60 ells English, and so consequently, 5 elles Flemmish, do make but 3 elles English.

English: Therfore say by the rule of three, if 5 elles Flemmish do make 3 elles English, how many elles English will 42 elles $\frac{2}{3}$ Flemmish make? Multiply and diuide, and you shall find 25 elles $\frac{3}{5}$ English, and so many elles English doth 42 ells $\frac{2}{3}$ Flemish containe: the like is to be done of all others.

7 More I haue bought a péece of Tapestrie being 5 elles $\frac{3}{4}$ long, and 4 elles $\frac{2}{3}$ broade of Flaunders measure, I demaund how many elles square it maketh English measure? *Answ.* First, forasmuch as 3 elles English are worth 5 elles Flemish, therefore put 3 elles English into his square, in multiplying 3 by it selfe which maketh 9: likewise multiply 5 in it self squarely, and it will be 25. Then multiply 5 $\frac{3}{4}$, which is ẏ length of ẏ péece by 4 $\frac{2}{3}$, which is the bredth, and thereof commeth 26 elles $\frac{5}{6}$ square then say by the rule of thrée, if 25 ells square of Flemish measure be worth

9 elles ſquare of Engliſh meaſure, what are 26 elles $\frac{1}{6}$ Flemiſh worth? multiply and diuide & you ſhall find that they are worth 9 elles $\frac{13}{30}$ ſquare of Engliſh meaſure.

8. More at 3 s. 6 d. the elle Flemiſh, what is the Engliſh elle worth after the rate? *Anſw.* firſt, ſay if 5 elles Flemiſh be worth 3 elles Engliſh, what is 1 elle Flemiſh worth? multiply and diuide, and you ſhall find $\frac{3}{5}$ of an Engliſh elle. Then ſay againe by the rule of thrée, if $\frac{3}{5}$ of an Engliſh elle, be worth 3 s. 6 d. what is 1 Engliſh elle worth? multiply and diuide, and you ſhall find 5 s. 10 d. ſo much ſhall the Engliſh elle be worth.

9. More at 6 s. 8 d. the flemiſh elle ſquare, what is ye engliſh elle worth? *Anſwere*: ſay by the aforeſayd reaſon if 25 elles flemiſh ſquare, be worth 9 elles ſquare Engliſh, what is 1 elle ſquare flemiſh worth? multiply and diuide, & you ſhall find $\frac{9}{25}$ of a ſquare

Engliſh

English elle. Then say, if $\frac{9}{25}$ of an english ell be worth 6 s. 8 d. what is 1 square elle English worth? multiply and divide, and you shall find 18 s. 6 d. $\frac{2}{9}$, so much shall one english elle square be worth.

Chap. 6.

Of the reducing of the pawnes of Genes into English yards.

Note that 100 pawns do make 26 yards, & 1 pawn is $\frac{13}{50}$ of a yard after the same rate, & 3 pawnes $\frac{11}{13}$ do make 1 yard.

Example.

1 I Haue bought 97 pawnes $\frac{1}{2}$ of Genes veluet: I would know how many yardes they will make? *Answere*: I say by the rule of three, if 100 pawns do make 26 yards, what will 97 $\frac{1}{2}$ make, multiply and divide, and you shall haue 25 yards $\frac{7}{20}$. So many yards do the 97 pawnes $\frac{1}{2}$ cōtaine.

Or otherwise, take some other nū-

ber at your pleasure, as 25 pawnes which doe make 6 yards $\frac{1}{2}$, and then say by the rule of three, if 25 pawnes doe make 6 yards $\frac{1}{2}$, what will 97 $\frac{1}{2}$ Pawnes make? Multiply and divide, and you shall find 25 yards $\frac{7}{25}$ as before.

More, at 2 shillings 7d. the pawne of Genes, what wil the English yard be worth after the rate? *Answe.* Say by the rule of three, if $\frac{3}{5}$ of an English yard be worth 2 shillings $\frac{7}{12}$. What is $\frac{1}{1}$ yard worth? Multiply and divide, and you shall find 9 s. 11 d. $\frac{3}{13}$. So much is the English yard worth. Or otherwise multiply 100 pawnes which is 26 yards by 2 s. 7d. & thereof commeth 258 s. 4d. the which you must divide by 26 yards, & you shall find 9 s. 11 d. $\frac{3}{13}$, as before.

3 If 257 Pawnes $\frac{1}{2}$ be worth 20 li. 16 s, 8 d. What is one yard worth after the rate? Answ. Say by ye rule of three, if 257 $\frac{1}{2}$ pawnes bée worth 20 $\frac{5}{6}$, what are 3 pawnes $\frac{11}{13}$ worth?

Multiply

Multiply and diuide, and you shall find $\frac{1250}{4017}$ part of a pound, which is worth 6 s. 2 d. $\frac{0 \cdot 4}{1 5 5 9}$, and so much is one yard worth.

Chap. 7.

Of Marchandize sould by waight.

1. At 9 d. $\frac{1}{2}$ the ounce, what is ÿ li. waight worth? *Answe.* Say if $\frac{1}{1}$ giue 9 $\frac{1}{2}$, what will $\frac{16}{1}$ giue? Multiply and diuide, & you shall find 12 s. 8 d. so much is the yard worth?

Or otherwise, by the rules of practise, for 6 pence, take the $\frac{1}{2}$ of 16, which is 8 s. then for 3 d. take the $\frac{1}{4}$ of 16 s. which is 4 s. Finally, for the halfepeny, take 16 ob. which are 8 d. then adde all these numbers together and you shall find 12 s. 8 d. as before.

3. More, at 10 d. $\frac{1}{2}$ the ounce; what are 112 li waight worth after ÿ rate? *Answe.* Reduce 112 li into ounces, in multiplying 112 li by 16 ounces, & you shall haue 1792 ounces: thē say

by ye rule of three, if $\frac{1}{2}$ × 10 $\frac{2}{3}$ $\frac{1792}{1}$ Multiply and diuide, & you shall find 188 16 d, which doe make 78 li. 8 s. and so much are the 112 li worth after 10 d, $\frac{1}{2}$ the ounce.

4 At 12 s, 8 d, the li. waight, what is the ounce worth? *Answ.* Put 12 s. 8 d, into pence, and you shall haue 152 pence: then say by the rule of 3, if 60 ouces cost 152 pence, what shal 1 ounce cost? multiply and diuide, & you shall find 9 pence $\frac{1}{3}$, so much is the ounce worth.

Or otherwise, take the $\frac{1}{4}$ of 12 s 8 d, for 4 ounces, and thereof commeth 3 s, 2 d, then for one ounce, take the $\frac{1}{4}$ of 3 s, 2 d, and you shall haue 9 d, $\frac{1}{2}$, as before.

5 At 32 li, 10 s, the quintall, that is to say, the 100 li waight: what is 1 li. waight worth after the same rate? *Answere* Put 32 li, 10 s, all into shil. and you shall haue 650 s.

Then say by the rule of three, if 100 giue

giue 650, what will 1 giue? Multiply and diuide, and you shal find 6 s, 6 d. so much is the li. worth.

6. If one pound waight of Saffron do cost me 18 s. 8 d. what shall 355 li. 10 ounces cost me by the same price? *Answere.* Say by the rule of three, if $\frac{1}{1} \times 18\frac{2}{3}$ $355\frac{5}{8}$. Multiply and diuide, and you shall find 331 li. 18 s. 4 d. so much are the 355 li. 10 ounces worth.

Breefe Rules of waight.

Who that multiplyeth the pence that 1 li. waight is worth by 5, and diuideth the product thereof by 12, he shall find how many pounds in money the quintall is worth, that is to say, how much the 100 li waight is worth.

And contrariwise he that multiplieth the pounds of money that the 100 li. waight is worth by 12, and diui-

deth the product by 5 shall find how many pence the pounde waight is worth.

Example.

At 17 pence the pound waight, what is the 100 pound waight worth? *Answ.* Multiply 17 by 5, and thereof commeth 85, diuide the same by 12, and you shall find 7 pound $\frac{1}{12}$ in money, which $\frac{1}{12}$ is worth one shilling & eight pence. So much is the 100 li. waight worth.

More, at 13 li. the 100 li. waight, what is one pound waight worth? *Answe.* Multiply 13 by 12 and thereof commeth 156: the which diuide by 5, and you shall find 31 d. $\frac{1}{5}$, which $\frac{1}{5}$ is 2s, 7d, $\frac{1}{5}$, and so much is one pound waight worth.

The like is to be done of yards, elles, or of any other measure, when we reckon but 5 score to the hundred.

Briefe Rules for measure.

Who that multiplieth the pence that one

one elle is worth, by 2. And diuideth the product by 4, hee shall find how many pounds in money the 125 ells are worth, which 120 elles we count but for a hundred in this place, because of worke, which measure is vsed for Canuas onely.

Or otherwise, if you diuide the pennies, that one elle is worth, by 2: you shall haue in your quotient ẏ pounds that the sayd 120 ells are worth, and if any thing remaine, they are parts of a li.

And contrariwise, he that multiplyeth the pounds in money that the 120 elles are worth, by 4, and diuideth ẏ of-come by 2, shall find how many pence the elle is worth.

Or otherwise, if you multiply the pounds that 120 ells are worth, by 2, you shall find in the product how many pennies one elle is worth.

Example.

At 10 pence the elle, what are 120 elles worth? *Answe.* Multiply 10d. by

by 2, and thereof commeth 20. The which diuide by 4, and you shall find 5 pound, so many pounds in money are 120 elles worth, at 10 d. the elle.

Or otherwise, diuide 10 penies by 2, and thereof cometh into your quotient 5: which 5, doth represent 5 li. and so many pounds are the 120 ells worth, as before.

More, at 9 pound the 120 elles, what is one elle worth? *Answere.* Multiply 9 li. by 4, and thereof commeth 36, the which diuide by 2, and you shall find 18 d. so much is one elle worth.

Or otherwise, if you multiply 9 pounds, which is the price that the 120 elles are worth by 2, you shall haue in the product 18 which 18 doth signifie ÿ penies that 1 elle is worth, when the 120 elles doth cost 9 li. as before.

The like is to be done of all maner of wares, which are sold after 120. for the hundred.

Briefe Rules for our hundreth waight here at London, which *is after* 112 *lib. for the C.*

VVho that multiplieth the d. ẏ 1 li, waight is worth by 7, and diuideth ẏ product by 15, shal find how many pounds in monney the 112 li, waight is worth.

And contrariwise, hee that multiplyeth the poūds in money, that 112 li, is worth by 15, and diuideth the product by 7, shall find how many pence one li, waight is worth.

Example.

At 9 pence the pound waight, what is ẏ 112 li, waight worth? *Answ.* Multiply 9 d, by 7, and thereof commeth 63 the which diuide by 15 and you shall find 4 li. $\frac{3}{15}$ which being abbreuied is $\frac{1}{5}$ of a pound, being worth 4 s. And thus the 112 li, is worth 4 pounds, 4 shillings, after the rate of 9 d, the li.

At

At 8 li. the 112 li waight, what is 1 li. waight worth? *Answ.* Multiply 8 li, by 15 and thereof cometh 120 the which diuide by 7 and you shall find 17 d. $\frac{1}{7}$, so much is 1 li, waight worth when the 112 li, is worth 8 pounds.

Chap. 8.

Of Tares and allowances of Marchandize sould by waight.

1. At 12 li, the 100 suttell, what shall 987 li, suttell bee worth? In giuing 4 li, waight vpon euery 100 for tret? *Answe.* Ad 4 li, vnto 100 and you shal haue 104. Then say by the Rule of three, if 104 be worth 12 li, what are 987 poūd waight worth? multiply & diuide & you shal find 113 li, $\frac{23}{26}$ which is worth 17s, 8d, $\frac{4}{13}$. So much shall the 987 li, waight be worth.

104. | 12. | 987.

2 At 6s, 8d. ye pound waight, what shal 345 li, $\frac{1}{2}$, be worth in giuing 4 li. waight vpon euery 100 for the tret? *Ansure.* Sée first by the rule of thrée, what the 100 poũd is worth saying, if $\frac{1}{1} \times 6\frac{2}{3}$. $\frac{100}{1}$. Multiply and diuide, and you shall find 33 li. $\frac{1}{3}$, then adde 4 li. vnto 100 and they are 104 then say againe by the rule of thrée, if 104 li, be sould for 33 li, $\frac{1}{3}$, for how much shall 345 li, $\frac{1}{2}$ be sould? Multiply and diuide, & you shall find 110 li. 14s, 8 d $\frac{11}{13}$. For so much shall the 345 $\frac{1}{2}$ be sould, at 6s, 8d, the pound, in giuing 4 vpon the 100.

3 More, if 100 li. be worth 36s, 8d. what shall 780 li. bée worth, in rebating 4 li. vpõ euery 100, for tare and closse? *Ans.* multiply 780 by 4, & thereof cõeth 3120. The which diuide by 100, and you shall haue 31 li. $\frac{1}{5}$: abate 31 $\frac{1}{5}$ from 780, and there wil remain 748 $\frac{4}{5}$. Then say by the rule of thrée, if $\frac{100}{1}$ do cost 36 $\frac{2}{3}$, what will 748 $\frac{4}{5}$ cost after the rate? Multiply and diuide so shall

shall you find 1748,6d,$\frac{13}{15}$, & so much shall the 78 li, cost, in rebating 4 li. vpon euery 100, for Tare & Closse.

4 More, whether he doth loose more that giueth 5 li, vppon the 100, or hee that rebateth 5 li, in the 100, for tare and closse? *Answ.* First, note that hee which giueth 5 li, vppon the 100. giueth 105 for 100: and he which rebateth 5 li, in the 100 giueth the 100 for 95. Therefore, say by the Rule of three, if 105 be giuen for 100, for how much shall the 100 be giuen? Multiply and diuide, and you shall find 95, $\frac{5}{21}$, and hee which rebateth 5 in the 100 maketh but 95 of a 100: so that hee looseth 5 in the 100, and the other which giueth 5 vpon the 100, looseth but 4 $\frac{15}{21}$, vppon the 100. Thus you may see that hee which rebateth 5 in the 100 loseth more by $\frac{5}{21}$ in the 100, then the other which gaue 5 vppon the 100 for Tare and Closse.

5 If 100 li. of Allom doe cost mee

26s, 8d, how shall I sell ye li. waight to gaine after the rate of 10 vpon the 100? *Answe.* Put 26 s, 8d, all into pence, and you shall haue 320d. Thē say by the rule of thrée, if a 100 giue a 110, what shall 320 giue? Multiply 320 by 110 and diuide the product by a 100, and you shall find 352d. Then say, again if 100 li, be worth 352 d. what is 1 li. worth? multiply and diuide, and you shal haue 3 d, $\frac{26}{50}$: which $\frac{26}{50}$ is worth $\frac{1}{2}$, and $\frac{1}{25}$ of $\frac{1}{2}$. That is to say, ye pound waight shalbe worth 3 d. $\frac{1}{2}$, $\frac{1}{25}$ of a halfe penny, in gaining 10 vpon the 100.

6 If one pound waight doe cost me 6 s, 10d, and I sell the same for 7s, 2d I demand how much I shal gain vppon the 100 li of money after the rate? *Answe.* Say by the rule of thrée if 6 $\frac{5}{6}$ yéeld 7 $\frac{1}{6}$: what will $\frac{100}{1}$ yéeld. Put the whole nūbers into their broken, thē multiply and diuide, and you shal find 104 $\frac{36}{41}$ from the which subtract 100, and there resteth 4 li. $\frac{36}{41}$ so

much

much is gained vpon the 100 pound of money after the rate.

7 More, if one pound doe cost me 5s 4d, and I sell the same againe for 4s, 9d. I demaund how much I shal lose vpon the 100 pound of money? Ans. Say, if 5 $\frac{1}{3}$, do giue but 4 $\frac{3}{4}$ what shal $\frac{100}{1}$ giue? Put the whole number into their broken, Then multiply and diuide, and you shall finde 89 $\frac{1}{16}$, the which you must subtract from a 100, and there will remaine 10 li. $\frac{15}{16}$, so much is lost vpon the 100 li. of money.

8 More, if the li. waight doe cost me 3s. 2d, and I sell it againe for 4s, 4d. how much shall I gaine vpon 20s? Ans. Say if 3 $\frac{1}{6}$ giue 4 $\frac{1}{3}$, what shal $\frac{20}{1}$ giue? Multiply and diuide and you shall find 27s. $\frac{7}{19}$, from the which abate 20s. and there will remaine 7s. $\frac{7}{19}$ which is 4d. $\frac{8}{19}$, & so much is gained vpon the pound of money, that is to say, vpon 20 s.

9 If the pound waight doe cost me 4 s. 4 d. and I sell it again for 3 s. 2 d. I demaund how much I shall lose in the pound of money? that is to say in twenty shillings. *Ans.* say if 4 $\frac{1}{3}$ giue but 3 $\frac{1}{6}$ what wil $\frac{20}{1}$ giue? multiply and diuide & you shall find 14 s. $\frac{8}{13}$, the which you must abate from 20 s. and there will remaine 5 s. $\frac{5}{13}$ which $\frac{5}{13}$ is worth 4 d. $\frac{8}{13}$ of a penny, and so much is lost vpon the pound of monney.

Chap. 9

Of certaine questions, done by the double rule, and also by the Rule *of three composed.*

10 A Marchant hath sold wines for the sum of 300 pounds, and he hath gained therein after 10 li. vpon the 100 li The question is to know, how much hee gained in all? *Answe.* say by the Rule of three, if a 110 li, do gaine 10 li. what will 300 li, gaine? Multiply and diuide, & you

ſhall find 27 li. $\frac{5}{11}$, and ſo much hath he gained in all.

11 A Marchant hath bought a péece of Hampſhire Carſey containing 18 yards, for the price of 4 li. 10 s. The queſtion is to knowe, howe many yardes hée ſhall ſell for 33 s, 4 d, to gaine 20 s, in the whole péece? *Anſw.* Adde 20 s, unto 4 li. 10 s. and they make 5 li. 10 s. Then ſay by the rule of thrée, if 5 li, $\frac{1}{2}$ do yéeld me 18 yards what wil 1 li. $\frac{2}{3}$ yéeld? multiply and diuide, and you ſhall find 5 yardes, $\frac{5}{11}$. And ſo many yards ſhall hée ſell, to gaine 20 s, in the whole péece.

12 A Marchant hath ſould Sugars for the ſumme of 600 li. ready money and he hath gained in the whole, the ſumme of 60 li. The queſtion is, to know how much he hath gained upon the 100 li? *Anſwe.* Firſt you muſt ſubſtract 60 li, from 600 li, and there will remaine 540 li. Then ſay by the rule of thrée, if 540 li doe gaine

(21

60 li. what will 100 li, gaine? Multiply and diuide, & you shall find 11 li. $\frac{1}{9}$. And so much hath he gained vpon the 100 li.

13 More, if 1 li, waight of maces doe cost mee 5 s, 10 d, and afterward I doe sell the same for 6 s, the li to be payd for it at the end of 3 monethes: I demaund how much I shall gaine vpon 100 li. in 12 moneths after the rate? *Answ.* Say by the first part of the Rule of three composed: if 5 s, $\frac{5}{6}$ in $\frac{3}{1}$ moneths doe gaine $\frac{1}{6}$ of a shilling, which is 2 d. what will $\frac{100}{1}$ li gaine in $\frac{12}{1}$ moneths? multiply and diuide, and you shall find 11 li, $\frac{3}{7}$. And so much shall I gaine in 12 moneths, after the rate.

14 More, if 1 peece of Carsey do cost me 35 s, for what price may I sell ye same to be payd for it at the end of 3 moneths, so that I may gaine therby after the rate of 10 li vpon the 100 li. in 12 moneths? *Answere.* Say by the

first part of the Rule of three compo-
sed if 100 pounds in 12 moneths do
gaine 10 li, what wil 36 s. gaine in 3
moneths? Multiply and diuide, and
you shall find $\frac{1080}{1200}$ of a shilling, the
which being abbreuied, doth make
$\frac{9}{10}$ of a shilling, which is worth 10
d. $\frac{4}{5}$. the same you must adde with 36
s. and then you shal haue 36 s. 10 d. $\frac{4}{5}$
And for that price, I must sel the peece
of kersey for to gaine therein 10 li.
vpon the 100 li. in 12 months, and
giuing 3 moneths time for the pay-
ment.

15 More, if 6 yards of Northerne
Carsey doe cost me 8 s. and I sell 4
yards of the same Carsey for 6 s. I
demaund whether I gaine or lose,
and how much vpon a 100 li. of mon-
ney? *Answ.* First you must seeke
what the 4 yards of Carsey did cost:
saying by the rule of three, if 6 yards
doe cost 8 shillings, what wil 4 yards
cost multiply and diuide, & you shall
find 5 s. $\frac{1}{3}$, and so much did the sayde

4 yards cost, therfore abate the same 5 $\frac{1}{3}$ from 6 s, and there will remain $\frac{2}{3}$ of a shilling, which $\frac{2}{3}$ is gained in the same 4 yards of Carsey. Then say againe by the rule of thrée, if 5 $\frac{1}{3}$, doe gaine $\frac{2}{3}$: what will $\frac{100}{1}$ gaine? multiply and diuide and you shall find 12 and $\frac{8}{16}$, which $\frac{8}{16}$ being abbreuied is $\frac{1}{2}$. Therefore it appeareth that I shall gaine 12 li $\frac{1}{2}$ vpon the 100 li. in selling 4 yards of the sayd Carsey for 6 shillings.

16. More a Marchant hath bought a péece of Damaske which cost him 8 s. the yard ready money, and hée selleth the same againe to an other Marchant, for 10 s. the yard, but hée giueth two days for the payment, ẏ is to say, 2 moneths for the one halfe, and 5 moneths for the other $\frac{1}{2}$. The question is to know, how much the said first Marchant doth gaine vpon a 100 li. in 12 moneths after the rate aforesaid? *Answer*, you must adde the 2 moneths and the 5 moneths both

 together,

together and they make 7 moneths, whereof you must take the one halfe, which is 3 moneths $\frac{1}{2}$. And at that time, the second Marchant ought to haue payed the whole, at one entire paiment: and therfore say by the first part of the Rule of three composed. If $\frac{8}{1}$ s, in 3 $\frac{1}{2}$ moneths, dos gaine $\frac{3}{1}$ s, what will $\frac{100}{1}$ gaine in $\frac{12}{1}$ monethes? Multiply and diuide, and you shall find 85 li, $\frac{5}{7}$. And so much doth the first Marchant gaine vpon the 100 in 12 moneths.

17 A Marchant hath bought veluet at 13 s, 9 d, the yard ready money, & hee selleth the same for 14 s, 3 d, the yard, to be payd $\frac{1}{3}$ part in ready money, $\frac{1}{4}$ part at 3 moneths; and the rest which is $\frac{5}{12}$, is to bee payd to him at 5 moneths. The question is, to know how much ye first marchãt doth gain vpon the 100 li, in 12 moneths, after the same rate? *Answer.* See first at what time all the paiments ought to bee payd at once: and for to know the same

same you must multiply euery seue- rall paiment, by ye time it ought to be payd, & adde them togither, thē diuide the product by the total summe of all the paiments being added together. And your quotient wil shew at what time all ye paiments ought to be payd at once, as in ye former exāple, $\frac{1}{3}$ part in ready money is not multiplyed by any time, because it is payd presently then $\frac{1}{4}$ part being multiplyed by 3 moneths maketh $\frac{3}{4}$ of a moneth, and the rest being $\frac{5}{12}$ multiplyed by 5 mo- neths bringeth 2 $\frac{1}{12}$, then adde $\frac{3}{4}$ and 2 $\frac{1}{12}$ together, and they make 2 mo- neths $\frac{5}{6}$, the which is the iust time, that all the paiments ought to be paid at once. And therefore say by the first part of the rule of thrée composed. If 13 $\frac{1}{3}$ in 2 moneths $\frac{5}{6}$ do gaine $\frac{3}{4}$ of a pound, what will 100 li. gaine in 12 moneths after the rate? multiply and diuide, and you shall find 23 li. $\frac{69}{17}$. And so much doth he gaine vpon the 100 li. in 12 moneths.

18. A marchant hath bought fusteans which cost him 22 s. 6 d. the peece ready money, and he wil sell the same at 24 s. ẏ peece. The questiō is to know what time hee ought to giue for the paiment of ẏ same, to the end he may gaine after 9 li. vpon the 100 li. in 12 moneths? *Answare*: say if 22 $\frac{1}{2}$ doe gaine 1 $\frac{1}{2}$: what will $\frac{100}{1}$ gaine? multiply & diuide. & you shall find 6 $\frac{2}{3}$ of gaine. Then say againe by the rule of three, if $\frac{9}{1}$ of gaine do require $\frac{12}{1}$ what will 6 $\frac{2}{3}$ of gaine require? multiply & diuide, & you shall find 8 $\frac{8}{9}$, which is 8 moneths & $\frac{8}{9}$. And so long time, ought he to giue, to gaine after the rate of 9 li. vpon the 100 li. in 12 moneths.

19. A marchant hath bought a peece of Satten being in length 20 yards which did cost him 12 pounds and 10 shil. ready mony. I demand for what price he shall sell the yard, to be payd at the end of 2 moneths, so ẏ he may gains after the rate of 10 li. vpon the 100 li. in 12 moneths? *Answere*, see first

first what the yard did cost him at the first, saying by the rule of three, if 20 yards cost 12 li. 10 shil. what will 1 yard cost? multiply and diuide, & you shall find 12 shil. and 6 d. Then say againe by the rule of three, if 12 moneths doe giue me 10 li. what will 2 moneths giue? multiply and diuide and you shall find 1 li. $\frac{2}{3}$. Adde therefore the sayd 1 $\frac{2}{3}$ vnto 100 and they are 101 $\frac{2}{3}$. Say therefore once againe, by the rule of three, if $\frac{100}{1}$ do giue mee 101 $\frac{2}{3}$ what will 12 $\frac{1}{2}$ giue? multiply and diuide, and you shall find 12 shi. & $\frac{17}{24}$ which is worth 8 d $\frac{1}{2}$, & for 12 s. 8 d, $\frac{1}{2}$ must he sell the yard of satten, giuing 2 moneths time for the payment to gaine after the rate of 10 li. vpon the 100 li, in 12 moneths.

20. More if 1 li. waight of Sinamō do cost me 8 s, ready mony, for what price shall I sell 100 li. waight of the same, to be paid the $\frac{1}{4}$ at 1 moneth & the residue at the end of 3 moneths, so that I may gaine after 9 li. vppon

the

the 100 li. in 12 months after the rate? *Answere.*

seeke first in how long time, both the Payments should bee made at once.

$\frac{1}{4}$. $\frac{1}{1}$. $\frac{1}{4}$.
$\frac{3}{4}$. $\frac{3}{1}$. 2 $\frac{1}{4}$.

2 $\frac{1}{2}$. *moneth.*

at once. The which to doe: you must multiply each paimēt of money, by ŷ time when it ought to be payd, that is to say you must multiply the first payment which is $\frac{1}{4}$ part by $\frac{1}{1}$ moneth & therof cometh $\frac{1}{4}$ of a moneth. Likewise you must multiply the next payment which is $\frac{3}{4}$ by 3 months & thereof will come 2 moneths $\frac{1}{4}$. Then add $\frac{1}{4}$ of a moneth, and 2 moneths $\frac{1}{4}$ both together, and they make 2 moneths $\frac{1}{2}$ which is the time, that both the payments ought to be payd at once. Thē say by the rule of three if 12 moneths do giue 9 li, what will 2 moneths $\frac{1}{2}$ giue? Multiply and diuide, and you shall find 1 $\frac{7}{8}$, say againe by the Rule of three. If 1 li waight doe cost mee 8s, what will 160 li. cost? Multiply and diuide, & you shal find 40 pound.

Then

Then say once againe, if $\frac{100}{1}$, do giue 101 $\frac{7}{8}$, what wil $\frac{40}{1}$ giue? Multiply & diuide, and you shall find 40 $\frac{3}{4}$. And for 40 li, 15 s. I must sell 100 pound waight of Sinamon, to be payd at ye 2 seuerall times aforesayd, to gaine therein after the rate of 9 li. vppon 100 li, in 12 moneths, as by example aforesayd.

20 When the quarter of wheat doth cost 6 s, 8 d, ye loafe of bread waying 20 ounces is sould for a halfepeny, I demand that if the quarter of wheat did cost tenne shillings, for how much shall the loafe of bread be sould, that wayeth 16 ounces? you shal answere by the first part of the Rule of three composed, which is mentioned in the second Chapter of the third part of this booke, where you must say by the same first part of the rule of 3 composed, if 6 $\frac{2}{3}$ | $\frac{20}{1}$ | $\frac{1}{2}$ | $\frac{10}{1}$ | $\frac{16}{1}$.

Then multiply the first number by the second, and the product thereof shalbe your diuisors. Likewise multi-

ply

ply the other thrée numbers the one by the other, and the product thereof shalbe your diuidend : as thus, first multiply $6\frac{2}{3}$ by $\frac{20}{1}$, and thereof commeth $\frac{400}{3}$ for your diuisor, then multiply $\frac{1}{2}$ by $\frac{10}{1}$, and the product therof by $\frac{16}{1}$, so you shall haue $\frac{160}{2}$ for your nūber that is to be diuided, then diuide $\frac{160}{2}$ by $\frac{400}{3}$, and therof commeth $\frac{480}{800}$, the which being abbreuied bringeth $\frac{3}{5}$ of a peny : and for that price must ẏ loafe of bread be sold, which waieth 16 ounces, whē the quarter of wheat is worth 10 shillings.

Or otherwise by the Rule of thrée at two times. First say, if $\frac{20}{1}$ ounces giue $\frac{1}{2}$, what wil $\frac{16}{1}$ ounces giue? multiply and diuide, and you shall find $\frac{2}{5}$ of a peny. Then say againe, if $6\frac{2}{3}$ do giue me $\frac{2}{5}$, what will $\frac{10}{1}$ giue? Multiply and diuide, and you shall find $\frac{3}{5}$ of a peny, as afore is sayd.

21. When ẏ cariage of one hundreth waight of marchādise 50 miles, doth cost 5 s̄, what shall the cariage of 500 waight

waight cost me for 16 mile? *Answe.*
By the first part of the Rule of 3 cō-
posed, saying, if 100 | 50 | 5 | 500 | 16.
Multiply 100 by 50, the product wil
be 5000, which shall bée your diuisor.
Then multiply 5 times 500 by 16, &
thereof commeth 40000 for your di-
uidend. Therefore diuide 40000 by
5000; and you shall find 8 s. so much
shall cost the carriage of 500 waight
16 miles.

Or otherwise by the double rule of
thrée that is to say, by the rule of thrée
at two times: first say, if 50 miles do
pay 5 s, what shal 16 miles pay? mul-
tiply and diuide, and you shall find 1
s. $\frac{3}{5}$. Then say againe, if 100 waight
doe cost mée 1 s. $\frac{3}{5}$, what shall 500
waight cost? Multiply and diuide, &
you shall find 8 s. as before.

22 When the carriage of 100 poūd
waight of marchandize 84 miles doth
cost me 6 s. how many miles may I
haue 64 poūd waight, caried for 3 s.
4 d. *Answe.* by the second part of the
Rule

Rule of thrée composed, and say if $\frac{100}{1} \mid \frac{84}{1} \mid \frac{6}{1} \mid \frac{64}{1} \mid 3\,\frac{1}{3}$.

Then multiply the fourth number $\frac{64}{1}$, by the third number $\frac{6}{1}$ and therof cometh $\frac{384}{1}$ for your diuisor. Likewise multiply $3\,\frac{1}{3}$, by $\frac{100}{1}$, and by $\frac{84}{1}$, & you shall haue in the product $\frac{8400}{3}$: then diuide $\frac{8400}{3}$ by $\frac{384}{1}$, & you shal find 72 miles, & $\frac{11}{12}$ of a mile. So many miles shall the 64li waight be caried, for 3 shil 4 d.

Otherwise by the rule of thrée, at two times: First, say if 100 waight doe cost me 6 d. what will 94 pound waight cost? Multiply and diuide and you shal find 3 s, $\frac{21}{25}$. Then say if $3\,\frac{21}{26}$ be payd for 84 miles cariage: for how many miles shal 3 s. $\frac{1}{3}$ be payd? Multiply and diuide, & you shall find 72 miles $\frac{11}{12}$ as before.

23 If 100 horses, in 100 daies, do spend 180 quarters of oats: how many quarters of oates will 350 horses spend in 150 daies? *Answ.* By the first part of the rule of thrée composed you must multiply 180 times 350, by

150:

150: and diuide the product by 100 times 100: and you shall find 945 quarters. So many quarters of oats will 350 horses spend, in 150 daies. Or otherwise by the rule of 3 at two times: First say, if 100 daies do yeeld me 180 quarters of oates: what shal 150 daies yeeld? multiply and diuide and you shal find 270 quarters: then say again, if 100 horses do spend 270 quarters of oats how many quarters of oates will 350 horses spend? Multiply and diuide, and you shall find 945 quarters, as before.

Chap. 10

Of the Rule of fellowship, without any time limited.

The rule of fellowship is thus you must set down each mans sum of mony that he layeth into company, every one directly vnder the other, the which sums you shall adde all together, and the totall summe

sum of all their whole stocks being thus assembled shalbe your common diuisor, to the finding out of euerye mans part of ye gaine. Then you shal multiply either ye gaine, or els ye losse which soeuer of them doth happen by each mans portiõ of money yt he laid in, and diuide the products by the said diuisor: so shall you haue in your quotient euery mans part of the gaine, if any thing be gained, or els of the losse if any thing be lost.

Example.

1 Two Marchants haue layd their money in company together: ye first layd in 500 li. The second laid in 300 li. and with occupying they haue gained 64 li. I demaund, how much ech man shall haue of the same gaines according to the monney that he layd in? *Answe.* Adde 500 and 300 both together, which are the parcels or summs that they both laid in, and therof commeth 800 for your diuisor: then say by the Rule of thre,

if

if 800 li. which is the whole stock doe gaine 64 li. what shall 500 li. gaine? (which is the first mans money that hée layd in) multiply and diuide and you shall find 40 li. for the first mans part of the gaine: then say if 800 giue 64, what will 300 giue? Multiply and diuide, and you shall find 24 li. for the second mans part of the gaine.

500
300 | 800 | 64 | 500.
800
800 | 64 | 300.

Or otherwise, put 500 li. which is ẏ first mãs money that he layd in, ouer the 800 li. which is ẏ whole stock, & you shall haue $\frac{500}{800}$, which béeing abbreuied, do make $\frac{5}{8}$ and such part of ẏ gaine shall the first man take, that is to say $\frac{5}{8}$ of 64 li. which is 40 li. And consequently, by the same manner, ẏ second shall take the $\frac{3}{8}$ of 64, which is 24 pound, for his part of his gaine as

before.

5	00	3	00
8	00	8	00

2 Two marchants haue companied together, the first layd in 640 li. & he taketh $\frac{5}{8}$ parts of the gaine, I demaund how much the second Marchant layd in? *Answ.* Seeing that the first marchant taketh $\frac{5}{8}$ of ye gaine it followeth that the secōd marchant must haue $\frac{3}{8}$, which is the rest, and therefore say by the Rule of three, if $\frac{5}{8}$ of the gaine which the first man taketh did lay into the stock $\frac{640}{1}$. How much shall $\frac{3}{8}$ of the gain lay in, which is the second mans gaine? Multiply and diuide, and you shall find 384 li. so much ought the second man to lay into company.

3 Two Marchants haue companied together, the first man layd in 640 li. and the second hath layde in so much monney for his part, that he must haue 60 li. for his part of 100 li.

li that they haue gayned. I demand how much the second man did lay into company? *Answe.* Seeing that the second man taketh 60 li. of the gaine, it followeth that the first must haue the rest of the 100 li. which is but 40 pound: Therefore say by the Rule of three, if 40 li do lay in 640 li. what shall 60 li. lay in? multiply and diuide and you shall find 960 li. so much did the second Marchant lay in.

4 Two Marchants haue companied together, the first layd in 83 li 6 s. 8 d. the second layd in 170 duckets & they haue gained 100 li. of the which the first man must haue 60 li. I demand what the ducket was worth? *Answe.* Seeing that the first man must haue 60 li it followeth that the second must haue 40 li: therefore say by the Rule of three, if 60 li. do gaine, that ye first man taketh, did lay in 83 li. 6 s 8 d. principall, how much shal 40 li. gaine put in, which is the gaine

that the second man taketh, multiply and diuide, and you shall find 55 li. $\frac{5}{9}$, so much are ỹ 170 Duckets worth. Then put 55 li. $\frac{5}{9}$ into shillings, and you shall haue 1111 s. $\frac{1}{9}$. So then for to know what the Ducket is worth, say by the Rule of three, if $\frac{170}{1}$ giue 1111. $\frac{1}{9}$, what will $\frac{1}{1}$ giue? Multiply and diuide, and you shall find 6 s. 6 d. $\frac{2}{5}\frac{1}{17}$, so much is the Ducket worth.

5 Two Marchants haue companied together, the second man layd in more by 30 li. then did the first man and they gained 120 li. of the which ỹ first man ought to haue 50 li. I demaund what each of them did lay in? *Answe.* From 120 li abate 50 li. and there resteth 70 li. for ỹ second mans part: so that by this meane the second man (because he layd in 30 li. more than ỹ first man did, he taketh 20 li. more of ỹ gain: & therfore say by the rule of three, if 20 li. gaine, did lay in 30 li principall, how much shall 50 li gaine lay in? Multiply and diuide, & you

you shall find 75 li. so much did the first man lay in, and consequently ẏ second layd in 105 li.

6 Two marchants haue companied together, the second hath laid in twise so much as the first man did, and 10 li more: and they haue gained 100 li. of the which, ẏ first ought to haue 32 li. for his part: I demaund how much each of them did lay into company? *An.* If it were not for the 10 li. that the second man laid in more than the first, hee should haue had but 64 li. of the gaine, which is the double of the first mans part. But because he layd in 10 li. more, hee hath therefore 4 pound more of the gaine, and therfore say by the rule of three, if 4 li. gaine did laye in 10 li. of principall (which was ouer and aboue ẏ double of ẏ first mans layings in) what shal 32 li. of gaines lay in? which is the first mans part of the gaines that he taketh, multiply and diuide, and you shall finde 80 li. for the first mans laying in: and so consequently 170 li.

for

for the second mans portion that he layd in.

7 Two Marchants haue companied together and they haue gained 100 li. of the which the first must haue after the rate of 10 li, vpon the 100 li. and the second must haue after ẏ rate of 15 li. vpon the 100 li. I demaund how much each of thē ought to haue *Answ.* Put 10 li. for the first mans laying in, & 15 li, for the second mans laying in. Adde therefore 10 li. and 15 li. together, and they make 25 li. Then put 10 ouer 25, & it is $\frac{10}{25}$ which beeing abreuied are $\frac{2}{5}$. Therefore he ẏ taketh 10 li. vpon the 100 li. must haue ẏ $\frac{2}{5}$ of the gaine, which is 40 li. Thē put 15 ouer 25, & it is $\frac{15}{25}$ which beeing abreuied are $\frac{3}{5}$. Therefore the second must haue $\frac{3}{5}$ of the 100 li. which is 60 li.

8 Two marchants haue companied together, the first laid in 46 li, 18 s. and the second layd in 33 li, 2 s, so they

they haue gaine 30 li. I demaund how much euery man shall haue for his part of the gaine? *Answere.* Adde 46 li. 18 s, & 33 li. 2 s, both together, and you shal find 80 li, for your common diuisor, then say if 80 li. which is all their stock, do gaine 30 li, what will 46 $\frac{9}{10}$ gaine? which is the mony ẏ the first man layd in: multiply and diuide, and you shall find 17 pound, 11 s. 9 pence: for the first mans part of the gaine. Then say againe by the rule of three if 18 li, doe gaine 30 li, what will 33 li, $\frac{1}{10}$ gaine, which was the second mans money that he layd in: multiply and diuide, and you shal find 12 li, 8 s, 3 d. for the secōd mans part of the gaine.

And after the same maner shall you do, in case that they were 3 or 4 marchants that would cōpany together. Adding all and euery of their sums of mony (which they lay into ẏ stock) into one totall sum, which shall be your common diuisor: and thē work with the rest, as is taught in the for-

ner question of the rule of company.

Example.

9. Thrée Marchants haue companied together, the first laid in I know not how much: the second did put in 20 péeces of cloth: and the third hath layd in 500 pound. So at the end of their company, their gaines amounted vnto a 1000 li. whereof the first man ought to haue 350 pound, and the second must haue 400 pound.

Now I demaund, how much the first man did lay in, & for how much the 20 péeces of cloth were put into company.

Answere.

Séeing that the first and the second Marchants must haue 750 li, for their parts of the gaine. Then the third man must haue the rest of the 1000 li, which is 250 li. And therefore say by the rule of thrée, if 250 li. gaine,

gaine, be come of 500 li principall, of how much shall come 350 li. gaine? which the first man taketh, multiply and diuide and you shall find 700 li. So much did the first man lay in: thē say if 250 li. gaine, be come of 500 li. principall, of how much will come 400 li, which is the gaine that the second man taketh. Multiply and diuide, and you shall find 800 li. For that price were the 20 péeces of cloth layd into company.

10. Thrée Marchants haue gained 100 li, the first must haue the $\frac{1}{2}$, ye second must haue $\frac{1}{3}$, and the third must haue $\frac{1}{4}$. I demand how much euery man must haue of the gaine? *Answ.* Reduce $\frac{1}{2}$, $\frac{1}{3}$ and $\frac{1}{4}$, into a common denomination, after the order of the second reduction in Fractions, and you shall find $\frac{12}{24}$, for the $\frac{1}{2}$, $\frac{8}{24}$ for the $\frac{1}{3}$, and $\frac{6}{24}$ for the $\frac{1}{4}$: Then take 12 for the first mans laying in, 8 for the second mans laying in, and 6 for the third mans laying in. The which

three numbers beeing added together, ſhalbe you common diuiſor, and they do make 26. Thē multiply 100 li. by 12, for the firſt man: then againe 100 li. by 8 for the ſecond: and laſt of all 100 li. by 6 for the third man. And diuide ẏ products of euery multiplication by 26. So ſhall you find 46 li. $\frac{2}{13}$ for the firſt mans part of the gaine 30 li $\frac{10}{13}$ for the ſecond mans part: & 23 li, $\frac{1}{13}$, for the third mans part.

11 Two Marchants haue gained 100 li the firſt muſt haue $\frac{1}{2}$ and 5 li. more, the ſecond muſt haue $\frac{1}{3}$ and 4 li. more, I demaund how much each of them ſhall haue? *Anſwere.* Firſt from 100 abate 5 and 4, which are 9, ſo there will remaine 91, then take ẏ $\frac{1}{2}$ of 100 li, which is 50 li, for the firſt mans laying is. Likewiſe, take $\frac{1}{3}$ of 100 li, for the ſecond mans laying in, which is 33 li. $\frac{1}{3}$. Then adde 50 li, & 33 li, $\frac{1}{3}$ together, and you ſhall haue 83 li, $\frac{1}{3}$ for your common diuiſor: thē multiply 91 pound by 50, and diuide

by

by 83 $\frac{1}{3}$, and thereof commeth 54 li. $\frac{3}{5}$ vnto the which number adde 5, and all is 58 li, $\frac{3}{5}$ for the first mans part of the gaine. Likewise multiply 91 by 33 $\frac{1}{3}$, and diuide by 83 $\frac{1}{3}$, & you shall find 36 li, $\frac{2}{5}$, vnto the which adde 4, and you shall haue 40 li, $\frac{2}{5}$ for the second mans part.

12 Two Marchants haue gayned 100 li. the first must haue ẏ $\frac{1}{2}$ lesse by 4 pound, the second must haue $\frac{1}{3}$ lesse by 2 pound. I demaund how much each of them shall haue? Answ. Adde 4 and 2 with 100, & they make 106 Then take, as before is said, 50 li, for the first man: and 33 $\frac{1}{3}$ for the second; and add them both together, and they be 83 $\frac{1}{3}$, which shall be your diuisor. Then multiply 106 by 50, & diuide the product by 83 $\frac{1}{3}$, so thereof commeth 63 li, $\frac{3}{5}$. From the which abate the 4 li, lesse that the first man taketh, and then is there remayning 52 li, $\frac{3}{5}$ for his part. Likewise multiply 106 by 33 $\frac{1}{3}$, and diuide by 83 $\frac{1}{3}$

and

and you shall find 42 li. $\frac{2}{3}$, from the which abate 2 li. lesse, and there remaineth 40 li. $\frac{2}{3}$ for the second mans part.

The Rule of Fellowship with time.

The mony that euery man laieth in, must be multiplied by ẏ time that it cōtinueth in company: and of that which cometh thereof, you shall make their new layings in for each of them: and then multiply the gains by euery one of them seuerally, & the of-comes you shal diuide by all their new layings in added together, and then you shall haue proportionally, each mans part of the gaine according to his laying in.

Example.

1 Two Marchants haue companied together, the first hath put in the first of Ianuarie 450 pound, the second did lay in the 2 of May 750 pounde.

And

And at the yeeres end, they had gay-
ned 100 li. I demand how much each
of them shall haue of the gaine? *Ans.*
for as much as ẏ first did put 450 li.
the first of January, his money cõti-
nued in company 12 moneths, & ther-
fore multiply 450 by 12 moneths, &
therof commeth 5400, for his new
laying in. And the second laid in his
750 li. but at the first day of May: so
that his money remained in cõpany
but 8 moneths. Therfore multiply
his 750 li. by 8, & therof cometh 6000
for his new laying in. Then ad 5400
with 6000, and they make 11400 for
your common diuisor. Thē multiply
100 li. which is the gaines by 5400: &
diuide the product by 11400, & ther-
of will come 48 li. $\frac{7}{19}$ for ẏ first mans
part of the gaine. Likewise multiply
100 by 6000: and diuide the product
by 1140, and you shall find 52 $\frac{12}{19}$, &
so much must the second man haue
for his part of the gaine.

2 Two Marchants haue compani-
ed together, the first hath layd in the
first

first of Ianuarie 640 li. The second can lay in nothing vntill the first of Aprill: I demand how much he shall then lay in, to the end that hee may take halfe the gaine? Answ. Multiply 640 li. by 12 moneths, that his money abideth in company, and thereof will come 7680 li. for his laying in. And so much ought the second man to lay in, for because he taketh $\frac{1}{2}$ of the gaine. But for that that he putteth in nothing vntil the first of Aprill his mony can be in company no longer than 9 moneths. And therefore diuide 7680 by 9, and thereof will come 853 li. $\frac{1}{3}$, So much ought the second Marchant to lay in the first of Aprill, to the end that he may take the one halfe of the gaines.

3 Three Marchants haue companied together, the first layd in the first of March 100 li. The second layd in the first of Iune so much mony, that of the gaine, he must haue the $\frac{1}{3}$ part: and the third layd in the first of Nouember

nember so much money, that of the gains he must haue likewise $\frac{1}{3}$, & they continued in company untill the next March following. I demaund how much the second and the third Marchants did lay in? *Answ.* Multiply 100 li. which the first man did lay in, by 12 moneths, that his money continued in company, & thereof cometh 1200 for his laying in, and so much ought the second and the third Marchants each of the to lay in, because they part the gaines by third. But for that, that the second Marchant layeth in nothing til the first of Iune, his money can be in company but 9 moneths. Therfore diuide 1200 by 9 moneths, & thereof will come 133 $\frac{1}{3}$. And so much ought the second marchant to lay in. Then for asmuch as the third marchant did lay in nothing untill the first of Nouember & his money abideth in company but y space of 4 moneths. Therfore diuide 1200 by 4, and thereof cometh 300 li. And so much ought the third marchant

chant to lay into company.

4 Three Marchants haue compani-ed together, the first layd in, the first of January 100 Duckets. The second hath layd in 50 li. the first of March, and the third put in a Jewell the first of July, and at the yeeres end, they had gained 400 crownes: of the which the first Marchant must haue 50 crownes, and the second must haue 80. I demaund what the Ducket was worth, and at what price the Jewell was valued, which the third Marchant layd in. *Answre.* The first mans money being 100 Duckets multiplyed by 12 is 1200 Duckets by the Rule aforesayd, and he taketh 50 Crownes of the gaine: therefore say if 50 Crownes gaine be come of 1200, which was his stock, of how much shall come 80 Crownes gaine, that the second man taketh: multiply and diuide, and you shall find 1920 for the second Marchants laying in. Then say againe, if 50 crownes be come

come of 1200 stocke, of how much shall come 270 crownes, which the third man taketh of the gaine: multiply and diuide, and you shal find 6480 for the third marcahnts laying in. Then diuide 1920, which is the secōd mans laying in, by 10 months that his money did continue in company and you shal find 192 duckets, which are worth 50 li. because hee layd in 50 li Then diuide 50 li, (being first reduced into shillings by the said 192 Duckets) and thereof will come 5 shillings 2 pence $\frac{1}{2}$. So much was the Ducket worth: Finally, diuide 6480, (which is the third mans laying in) by 6 moneths that his Jewell remained in company, and you shall find 1080 Duckets, and for that price was the Jewell put into company.

5 Three Marchants haue companied together: The first layd in the first of January 100 li. and the first of April he hath taken back againe 20 li.

The

The second hath layd in the first of March 60 li, and afterward hee did lay in more 100 li, the first of August. The third layd in y^e first of July 150 li And the first of October he did take backe againe 50 li And at the yeeres end, they found that they had gained 160 li, I demand how much euery man shall haue of the gaine? *Ans.* Multiply 100 li, which the first man layd in by 12 moneths, and thereof commeth 1200 li, from that number abate 9 times 20 li which are 180 for that which he did take backe againe: and there will remaine 1020, for the first mans laying in. Then multiply 60 which the second man layd in by 10, and you shall haue 600: vnto the which ad 5 times 100 li. for y^e money he layd in more the first of August, which are 500, so al amounteth to 1100 for the second mans laying in After-wards multiply 150 pound, which the third man hath layd in, by 6 moneths, and thereof commeth 900, from the which nūber abate 3 times 50, & they

they are 150 for ẏ money that he did take back againe the first of October, so there will remaine 750, for the 3 mans laying in. Then procéede with the rest, as is taught in the first question of the Rule of Fellowship with time in adding 1020, 1100 and 750 all together, which shalbe your Diuisor. Then multiply 160 li which is the gaine by 1020, by 1100 and by 750: & diuide at euery time by your Diuisor, that is to say, by al their layings in added together, which is 2870: so you shall find $56\frac{248}{287}$ for the first man: $61\frac{93}{287}$ for the second: and $41\frac{233}{287}$ for the third man.

6 Two Marchants haue companied together, the first hath layd in 9[illegible]0 pounds for the space of 12 moneths, and he ought to haue 8 pound vppon the 100 pound of the gain. The secōd hath layd in 1120 li. for the space of 8 moneths and he ought to haue after 12 pound vpon the 100 pound of the gaine.

And at the yéeres end, they haue gained 800 li. I demand how much each of them shall haue of the gaine? *Answere.* Multiply 960 that the first man did lay in by 12 moneths, & the product therof multiply againe by 8, and you shal haue 92160, for the first mans laying in: thē multiply ẏ 1120 that the second hath laid in, by 8 moneths, and that which commeth therof, you shall multiply againe by 12, & you shall find 107520, for the second mans laying in Then procéede with the rest, as in the first question of the rule of Fellowship is declared, & as in the last example I haue taught you and you shall find 369 li. $\frac{3}{13}$ for the first man: and 430 li. $\frac{10}{13}$ for the second man.

The Rule of company, betweene Marchants, and their *Factors.*

7. NOte that the estimation of the body, or person of a Factor, is in

in such proportion to the stock which y^e marchant laieth in, as y^e gain of the sayd Factor is vnto the gaine of the marchant. As thus, if a marchant do deliuer into the hands of his Factor 200 li. to employ, & he to haue halfe the profit, the person of the sayd Factor shalbe esteemed to be worth 200 li. And if the Factor doe take but the $\frac{1}{3}$ of the gaine, he should haue but $\frac{1}{2}$ so much of the gain as the marchant taketh which must haue $\frac{2}{3}$: wherfore y^e person of the Factor is esteemed but the $\frac{1}{2}$ of that which the marchant layeth in, that is to say, 100 li.

And if the Factor did take the $\frac{2}{5}$ of the gain, then the marchant shal take the residue, which are $\frac{3}{5}$ of the gaine: wherfore the gain of the Marchant vnto that of the Factor, is in such proportion as 3 vnto 2. Then if you will know the estimation of the person of the Factor, say if 3 giue mée 2, what wil 200 giue? Multiply 200 by 2, and diuide by 3, so you shal find $133\frac{1}{3}$. Or otherwise you must con-

 sider

sider that the Factor taketh the $\frac{2}{3}$ of that which the marchāt taketh. And therfore take the $\frac{2}{3}$ of 200, & you shal find 133 $\frac{1}{3}$ as before: and so much is the person of the Factor estéemed to be worth.

8 And if the Marchant should deliuer unto his Factor 200 li. and the Factor would lay in 40 li. and his person to the end hée might haue the halfe of the gaine: I demand for how much shall his person be estéemed? *Answe.* abate 40 li. from 200 li. and there will remaine 160 li. And at so much shall his person be estéemed.

And if the Factor would take the $\frac{2}{3}$ of the gaine, his person with his 40 pound shalbe estéemed twise as much as the stock that the marchant layeth in, which should haue but $\frac{1}{3}$ of ẏ gain, for $\frac{2}{3}$ unto $\frac{1}{3}$ is in double proportion. Therefore double 200 pounds, and therof cometh 400 li. from the which abate 40 li. and there will remain 360 li. But if the Factor would take only

ly the $\frac{1}{3}$ of the gaine, that shall be but the $\frac{1}{2}$ of $\frac{2}{3}$ which the marchant taketh: and then the estimation of his person with his laying in should be estæmed but the halfe of ẏ which the marchāt layeth in: you must therfore take the $\frac{1}{2}$ of 200 li. which is 100 li from the which you shall abate 40 pound, and the rest which is 60 li. is the estimation of his person.

9 If it so chaunce for to make traffick of 240 li, that the person of the factor should be in such wise estæmed that hee should haue but the $\frac{1}{4}$ of the gaine, and yet hee would haue the $\frac{2}{3}$, I demaund how much ready money he ought to lay in, besides his person?

Answer. Sæing that his person gayneth the $\frac{1}{4}$, therefore al the whole laying in, which is 240 li shall gaine the rest, that is to say ẏ $\frac{3}{4}$, Now because $\frac{1}{4}$, is the $\frac{1}{2}$ of $\frac{2}{4}$, therefore his person shal be estæmed the $\frac{1}{3}$ of al the laying in Take then the $\frac{1}{3}$ of 240 li and you shall haue 80 li. for the estimation of

his of his person, and for because that he will haue halfe of the gaine, you shall adde 80 li with 240 li. and thereof commeth 320 li. of the which take the halfe, which is 160 li. & from the same you shall abate the 80 li. & there will remaine other 80 li, which he ought to lay in of ready money, & the Marchant must lay in the ouerplus, which amounteth to 160 li.

10 A Marchant hath deliuered to his Factor 1200 li to gouerne them in ye trade of marchandize, vpon such condition, that he for his seruice shall haue the $\frac{1}{3}$ of the gaine, if any thing be gained, and he shall beare the $\frac{1}{3}$ of the losse, if any thing be lost: I demaund, for howe much his person was esteemed? *Ans.* Seeing that the Factor taketh the $\frac{1}{3}$ of the gaine, his person ought to be esteemed as much as $\frac{1}{2}$ of the stocke which the marchant layeth in, that is to say, ye $\frac{1}{2}$ of 1200 li. which is 600 li. The reason is, for because the $\frac{1}{3}$ of the gain that

that the Factor taketh, is the $\frac{1}{2}$ of the $\frac{2}{3}$ of the gaine that the marchant taketh. And so the Factor his person is esteemed to be worth 600 li.

11 A Marchant hath deliuered vnto his Factor 1200 li. and the Factor layeth in 500 li and his person. Now because he layeth in 500 li. and his person, it is agreed between thē, that he shall take the $\frac{2}{5}$ of the gaine: I demaund, for how much his personne was esteemed? *Answe.* Forasmuch as the Factor taketh the $\frac{2}{5}$ of the gain he taketh the $\frac{2}{3}$ of that which ỹ marchant taketh, for $\frac{2}{5}$ are the $\frac{2}{3}$ of $\frac{3}{5}$: and therfore the Factors laying in, ought to be 800 li. which is the $\frac{2}{3}$ of 1200 li. that the marchant layd in. Then abate 500 li. which the Factor did lay in from 800 li. which should bée his whole stock & there remaineth 300 li. for the estimation of his person.

12 More, a marchant hath deliuered vnto his Factor 1000 li. vppon

such

such condition, that the Factor for his paines and seruice, shal haue ẏ gains of 200 li. as though he layde in so much ready money: I demaund what portion of ẏ gaine the said Factor shall take? *Answ.* See what part the 200 li. (which the Factor layde in) is of 1200. which is the whole stock of their company, & you shall find that it is the $\frac{1}{6}$, and such part of the gain shal the Factor take.

But in case, that in making their couenants, it were agreed betweene them, that the Factor should haue the gaine of 200 li. of the whole stocke which the marchāt layeth in, that is to say, of the 1000 li. Then should ẏ Factor take the $\frac{1}{5}$ of the gaine: for 200 li. is the $\frac{1}{5}$ of a 1000 li.

Chap. III.

Of the Rules of Barter: that is to say, to change ware for ware. &c.

1. Two Marchants will change their marchandize, ẏ one with the

the other. The one of them hath cloth of 7 s. 1 d. the yard, to sell for ready money, but in barter he will sell it for 8 s. 4 d. The other hath Sinamon of 4 s. 7 d. the li to sell for ready mony, I demaund howe hee shall sell it in barter that he be no loser? *Ans.* Say, if 7 $\frac{1}{12}$, (which is the price that the yard of cloth is worth in ready money) be sould in barter for 8 $\frac{1}{3}$, for what shall 4 $\frac{7}{12}$, bee sould in barter, which 4 $\frac{7}{12}$ is the price that ÿ pound of Sinamõ is worth in ready mony? reduce the whole numbers into their broken, and then multiply and diuide and you shall find 5 s. 4 d. $\frac{12}{17}$ parts of a penny, and for so much shall hee sell the pound of Sinamon in barter.

2 Two marchants will barter their marchandise ÿ one with the other. ÿ one of them hath Chamlets, of 2 li. 18 s. 4 d, the peece, to sell for ready money, and in barter he will sell the peece for 4 li. 3 s. 4 d. ÿ other hath fine caps of 35 s. 10 d, the dozen, to sell in barter

ter. I demaund what the dozen of cappes were worth in ready money? *An.* say if 4li. 3 s, 4d, which is ẏ ouer price of ẏ peece of Chamlet, be come of 2li. 18s, 4d, which was ẏ iust price of ẏ same, of what shall come 35 s, 10d, which is the ouer-price of the dozē of caps? Multiply and diuide, and you shall find 25s, 1 d, and so much are ẏ dozen of caps worth in ready mony.

3 Two Marchants will change their marchādize the one with the other: the one of them hath Fusteās of 18s, 4d, the peece to sel for ready money, & in barter he will sell the peece for 26s, 8d. The other hath tapestrie of 15 d, the elle to sel for ready money and in barter he wil sel it for 20 d the elle. I demaund which of them gaineth, and how much vpon the 100 li. of mony? *Ans.* say if 18 s, $\frac{1}{3}$ (which is the iust price of ẏ peece of Fustean) be sould in barter for 26 s, $\frac{2}{3}$: for how much shall 1 s, $\frac{1}{4}$, (which is the iust price of the ell of Tapestrie) be sold in barter

barter: multiply and diuide, and you shall find 21 d, $\frac{9}{11}$. And he doth ouersell it but for 20 d. so that of 21 d. $\frac{7}{11}$ he maketh but 20 d. And therfore say by the Rule of thrée, if the secōd marchant, of 21 $\frac{9}{11}$, do make but $\frac{20}{1}$ how much shall he lose in the $\frac{100}{1}$: Multiply and diuide, & you shall find 91 $\frac{1}{3}$, ỳ which béeing abated from 100, there will remain 8 $\frac{1}{3}$. And after the rate of 8 $\frac{1}{3}$, doth the second marchant lose in the 100. And consequently, the first marchant of 20 d. maketh 21 d. $\frac{9}{11}$, & therfore say again by the rule of thrée, if the first marchāt of $\frac{20}{1}$ do make 21 $\frac{9}{11}$, how much shall he gain vpon $\frac{100}{1}$ Multiply and diuide, and you shall find 109 li. $\frac{1}{11}$. And thus the first marchant gaineth after the rate of 9 li. $\frac{1}{11}$ vpon the 100 li. of money.

For your better vnderstanding of these questions, you must note, that when one Marchant gaineth of another after the rate of 10 li. vppon the 100 li. he gaineth the $\frac{1}{10}$ of his own principall, and the other which loseth

after

after the rate of 9 $\frac{1}{11}$ in the 100 li. hee loseth the $\frac{1}{11}$ of his principall And it may be proued thus: when one Marchãt wil sel his wares vnto another, which wares stand him but in a 100 li and hee will sell them for 110 li. therfore he of his 100 li. maketh 110 li and so he gaineth after 10 li vpon the 100, which is the $\frac{1}{10}$ of his principall, & the other which buyeth wares for 110 li ẏ cost the other but 100 li. of ẏ 110 li he maketh but 100 li. And therfore say by the rule of 3, if 110 be come of 100, how much shall come 100? Multiply & diuide, and you shal find 90 $\frac{10}{11}$. the which abate from 100 and there wil remaine 9 $\frac{1}{11}$ which is the $\frac{1}{11}$ of the principall that the secõd looseth in ẏ 100 li. as before is sayd. And therefore, who so that wil know what one Marchant gaineth of another, either after the rate of 10 li. vppon the 100 li which is the $\frac{1}{10}$ of his principall, or else after the rate of 20 li. vpon the 100 li which is the $\frac{1}{5}$, or of any other part, & that hee would

likewise

likewiſe knowe what part the other loſeth of his principall, hee muſt take for the numerator of the broken nū-ber of him that loſeth, as much as for him that gaineth, then adde the numerator and the denominator (of the broken number of him that gaineth) both together, and make thereof the denominator of the broken nūber of him that loſeth and thē ſhal you haue the iuſt part of him that loſeth: as by example, of him that gaineth after 10 li. vpon the 100 li. which is the $\frac{1}{10}$ of his principall: take the numerator of $\frac{1}{10}$ which is 1, and make that the numerator of the broken number of him that loſeth, then adde 1, which is the numerator of the Fraction of him yͤ gaineth with 10, which is his denominator, & you ſhall haue 11 for the denominator of the Fraction of him that loſeth. Then put 1 ouer the 11. & ſo you ſhall haue $\frac{1}{11}$. Thus it appeareth when one marchant gaineth of another after 10 li. vpon the 100 li, he gaineth the $\frac{1}{10}$ of his principall, and yͤ

other

other loseth 9 $\frac{1}{11}$, which is the $\frac{1}{11}$ of his principall. And if he would gaine after 20 vpon the 100li. which is the $\frac{1}{5}$ of his principall, the other should lose 16 $\frac{2}{3}$, which is the $\frac{1}{6}$ of his principall, and so is to be vnderstood of all other Fractions.

4 Two marchants will change their marchandize the one with the other, the one of them hath Sayes of 20 s, and 16 d. the péece to sel for ready money: and in barter he will sell the péece for 23 s. 4 d. and yet he will gaine moreouer, after 10 pound vpō the 100 pound. The other hath woll of 50 s, the 100 waight to sel for ready money. I demaund how he shall sell C. of woll in barter? *Answ.* Say if 20 s, 10, d, which is the iust price of the péece of Say, by sold in barter for 23 s, 4 d, for how much shall 50 s; (which is the iust price of the C. of woll) be sould in barter? Multiply & diuide, and you shall find 56 s. Then for because ỹ first marchāt will gain after

after 10 li. upon ẏ 100 li. he maketh of his 100 li. 110 li. so ẏ second marchant maketh of 110 li. but 100 li. And therfore say by the rule of 3, if ẏ secōd marchant of 110, do make but 100 how much shall he make of 56? Multiply and diuide, & you shall find 50s. 10d. $\frac{10}{11}$ of a peny, & for so much shall hée sell the hundred of woll in barter.

5 More, two marchants will change their marchandise the one with the other, the one of them hath Taffeta of 16 crownes the péece to sell for ready money, and in barter he will sell the péece for 20 crownes and yet he will gaine moreouer after ẏ rate of 10 li. upon the 100 pound. The other hath ginger of 3 s, 9 d. the pound waight, to sell in barter. I demaund what the pound did cost in ready money? *Ans.* say if 20 crownes which is ẏ surprice of the péece of Taffata, become of 16 crownes the iust price, of how much shall come 3 s. 9 d which is ẏ surprice

of the pound of Ginger? Multiply and diuide, and you shall find 3 shil. Then, for because that the Marchant of Taffata wil gaine after the rate of 10 vpon the 100: say if 100 doe giue 110: what shal 3 s. giue? multiply and diuide, and you shall find 3 s. 3 d. $\frac{3}{5}$, and so much did the pound of Ginger cost in ready money.

6 More, two marchants will change their marchandize, the one with y^e other, the one of thē hath worsters of 25 s. the peece to sell for ready money, and in barter he will sell the peece for 33 s, 4 d, and yet he loseth after 10 li. in the 100 li. the other hath ware of 3 li. 6 s 8 d. the 100 waight to sell for redy money. I would know for what price he should sell his ware in barter? *Ans.* : say if 25 s, which is the iust price of the peece of worsted, bee sold in barter for 33 s, 4 d, for how much shall 3 pound 6 s, 8 d, be sold: which is the iust price of the 100 of ware, as it was worth in ready money.

ney. Multiply and diuide & you shall
find 4 li. $\frac{4}{9}$ which is 8 s, 10 d, $\frac{2}{3}$, then
for because y^e the marchant of wor-
steds, loseth after 10 li. in the 100 li.
of 100 li he maketh but 90, and ther-
fore say, if 90 giue 100, what giueth
4 pound $\frac{4}{9}$? Multiply and diuide, and
you shal find 4 li. $\frac{76}{81}$, which is worth
18 s, 9 d, $\frac{5}{27}$ and for so much shall he
sell the 100 pound waight of ware
in Barter.

7 More, Two Marchants will
change their Marchandize the one w^t
the other: the one of them hath wor-
steds of 5 li, 6 s, 8 d, the peece to sell
for ready money, and in Barter hee
will sell the peece for 6 li, 13 s, 4 d, &
yet he loseth after 10 li, in the 100, &
the other hath Muske of 2 s 9 d, $\frac{1}{3}$ the
pound waight to sell in barter. I de-
maund what the pound did cost in
ready money? *Ans.* say, if 6 li, $\frac{2}{3}$,
which is the ouer price of the peece of
worsted become of 5 li. $\frac{1}{3}$, which is
the iust price of y^e same, of how much

shall come 2 s, 9 d, $\frac{1}{3}$. Multiply and diuide, & you shall find 2 s, $\frac{2}{9}$, which $\frac{2}{9}$ is 2 d, $\frac{2}{3}$: thē for because that the Merchant of Worsteds loseth after 10 li. in the 100 li. of a 100 he maketh but 90: and therfore say, if 100 giue but 90, how much shall 2 s. $\frac{2}{9}$ giue? Multiply and diuide, and you shall find 2 shil: and so much cost the pound of Muske in ready money.

Other Rules of Barter, wherein is *giuen some part in ready money.*

When a Marchāt ouerselleth his marchandize, and he wil haue also some part of his ouer-price in ready money: as the $\frac{1}{2}$, the $\frac{1}{3}$, or the $\frac{1}{4}$, &c. He must subtract the same part of money from the iust price, & also from the ouer price of his marchandize: and the two numbers that remaine after the subtractiō is made, shall be the two first numbers in the rule of thrée: and the iust price of the second Marchant shall bée the third number

number: to know how much he shall ouersell the part of his marchandize.

Example.

8. Two Marchants will change their marchandize the one with the other, the one of them hath fine Wooll at 5 li. the 100 li. waight to sell for ready mony, and in barter he will sell it for 6 li. and yet he will haue the $\frac{1}{3}$ in ready mony. The other hath cloth of 13 s. 4 d. the yard to sell for ready money. I would know how he shall sell the same in barter: *Ans.* take the $\frac{1}{3}$ of 6 li which is ye ouerprice of ye 100 of wooll, and that is 2 li. ye which you must abate from 5 li. which is the iust price of ye 100 of wooll, & also abate it from 6 li. which is the ouerprice, and there shall rest 3 li and 4 li. for ye two first numbers in the rule of thrée, thē take 13 s, 4 d, which is the iust price of a yard of cloth, for the third number: Then multiply and diuide & you shall find 17 s, 9 d. $\frac{1}{3}$: for so much shal the

the second sell his cloth in barter.

9 More two marchants wil change their marchandize the one with ye other, the one of them hath war of 3 li, 6 s, 8 d, the C. to sell for ready money, and in barter he will sell the same for 4 li, 3 s, 4 d, & yet he will haue the $\frac{1}{4}$ in ready money: and the other hath fine Crimson Satten of 15 s, ye yard, to sell in barter. I demand what it is worth in ready money? *Answ.* Take the $\frac{1}{4}$ of 4 li, 3 s, 4 d, which is 1 li, 0 s, 10 d, and abate it from 4 li, 3 s, 4 d, & also from 3 li 6 s, 8 d, & there resteth 3 li, 2 s, 6 d, and 2 li, 5 s, 10 d, for the two first numbers in the Rule of three. And 15 s, for the third number which 15 s, is the ouerprice of ye yard of Satte. Then Multiply and diuide and you shall find 11 s. And so much did the yard of Satten cost in ready money.

10 Two Marchants will change their Marchandize the one with the other

other: the one of them hath Tinne of 50s, the 100 li, waight to sell for ready money, and in barter he will sell it for 3 li. 6 s, 8 d, & he will gaine after 10 li, vpon the 100 li. and yet he wil haue also the one halfe in redy mony. The other hath leade of 3 halfe pence the li, to sell for ready money. I demand how he shall sell the li, of leade in barter? *An.* Sée first at 10 li, vpon the 100 li, what the 3 li, $\frac{1}{3}$ will come vnto, in saying by the Rule of thrée, if 100 giue 110, what will 3 $\frac{1}{3}$, giue? Multiply & diuide, and you shall find that they wil come to 3 li, $\frac{2}{3}$, which is 13 s, 4 d, of the which, the halfe which he demandeth in ready money, is 36 s, and 8 d the same being abated from 50 s, and also frõ 3 li, 13 s, 4 d, there will remain 13 s, 4 d, and 1 li. 16 s. 8 d. for the two first numbers in the Rule of thrée, which you must put all into halfepence, and the foresaid thrée halfepence shalbe the third number, and then multiply & diuide, and you shall find 4 d. $\frac{1}{8}$, and for so much shall

he sell the 1 li. of leade in barter.

11 More, two marchants will change their marchandise ẏ one with the other: the one of them hath steele of 16 s. 8 d the 100 li. waight, to sell for ready money and in barter he wil sell it for 25 s. and yet he loseth after 10 li. in the 100 li. but hee will haue the $\frac{1}{2}$ in ready money: the other hath yron of 6 s, 8 d, the hundred to sel in barter. I demaund what the hundred of yron did cost in ready money? *An.* say if 100 come but to 90, how much shall 25 s, come to? multiply and diuide, and you shall find 22 s 6 d. of the which number, take the $\frac{1}{2}$ which is 11 s, 3 d and subtract it from 22 s, 6 d, and also from 16 s, 8 d, and there will remain 11 s. 3 d. and 5 s, 5 d for the two first numbers in the Rule of three, and 6 s. 8 d. which is the ouerprice of a hũdred of yron, for the third nũber: then multiply and diuide, and you shall find 3 s. 2 d. $\frac{44}{27}$: & so much did the hundred of yron cost in ready money.

12 More, two marchāts will change the marchandize the one with the other: the one of them hath saies of 20 s, 10 d the peece to sell for ready money, & in barter he will sell the peece for 25 s & hee will haue the $\frac{1}{4}$ in ready mony. The other hath caps of 35 shil. the dozen, to sell for ready mony, but he will gaine after the rate of 10 li vpon the 100 li. I demaund how he shall sell a dozen of caps in barter? *Answere.* Say if 100 be worth 110. What shall 35 s, be worth, which is the iust price of ẏ dozen of caps? multiply and diuide, & you shall find 38 shil. 6 d. Thē take the $\frac{1}{4}$ of 25 s. which is 6 s, 3 d and subtract it from 20 shi. 10 d and also from 25 s and ther wil remain 14 s. 7 d. & 18 s. 9 d. for the 2 first numbers in the rule of three, and 38 s. 6 d. which is the iust price with his gaine in the dozen of caps for the third number: then multiply and diuide, and you shall find 49 s, 6 d, and for so much he shall sell the dozen of caps in barter.

The

Chap. 12

Of Exchanging of money from one place to another.

First you must note that at Antwerp they vse to make their accounts by Deniers de gros, that is to say, by pence Flemish, whereof 12 do make 1 s. Flemmish, and 20 s. Flemmish do make 1 li. de gros.

Example.

1 If I deliuer in Flaunders 500 li. Flemmish at 19 s, 6 d, de gros, ẏ is to say at 19 s, 6 d, Flẽmish, to receiue 20 s. at Londõ, I demand how much I shal receiue sterling at London for the said 500 li. Flemmish? *Answe.* Say if $19\frac{1}{2}$ giue $\frac{20}{1}$, what will $\frac{500}{1}$ giue? Multiply and diuide, and you shall find 512 li. 16 s. 4 d. $\frac{12}{13}$ of a penny. And so much sterling shall I receiue in London for my 500 pound Flemmish.

2.

2 If I deliuer in London 375 li. sterling, to receiue in Antwerp 21 s. 9 d. the gros, that is to say, Flemish, for euery pound sterling. I demaund how many pounds Flemish I shall receiue in Antwerp for the said 375 li. sterling? *Ans.* say if $\frac{20}{1}$ giue $21\frac{3}{4}$, what will $\frac{375}{1}$ giue? Multiply and diuide and you shall find 407 li. 16 s. 3 d. So many pounds Flemmish shall I receiue in Antwarpe for the sayd 375 li. ster. in Antwarpe.

3 If I take vp money at Antwarp, after 19 s 6 d. Flemish, to pay for the same at London 20 s. ster. and when the day of paymēt is come, I am forced to returne the same, & to take vp money againe in London to pay my bil of exchange, so that for 20 s. which I take vp héere, I must pay 19 s. 9 d. at Antwarpe. I demaund whether I doe winne or lose, and how much in, or vpon the 100 li, of money? *An.* Say, if $19\frac{3}{4}$, giue $19\frac{1}{2}$, what wil $\frac{100}{1}$ giue? multiply and diuide, & you shal find

find 98 $\frac{58}{79}$, the which béeing abated from 100, there will remaine 1, $\frac{21}{79}$. And so much do I lose upon the 100 pound of money.

4 If I take up at London 20 shil. starling to pay at Antwarp 21 s, 8 d. Flemish, and when the day of payment is come, my Factor is constrained to take up money againe at Antwarp, wherewith to pay the foresayd summe: and there he doth receiue 22 shil. Flemish, for the which I must pay 20 shil. at London. Now I demaund whether I do winne or lose, and how much upon the 100 li. of money after the rate? *Ansr.* Say if 21 $\frac{2}{3}$ giue $\frac{22}{1}$. What will $\frac{100}{1}$, giue? Multiply and diuide, & you shall find 101 $\frac{7}{13}$, from the which abate 100, & there will remaine 1 $\frac{7}{13}$, and so much shall I gaine upon the 100 pound of money.

The Exchange from London into France, is not like as it is into Flanders, but is deliuered by the French

crowne

crowne, which is worth 50 Souse Tournois the peece.

And heere must you note, that in France they make their account by Deniers Tournois, whereof 12 Deniers maketh 1 souse Tournois, and 20 souse tournois maketh 1 li. Tournois which they call a Liure or franc. and the French Crowne is currant among marchants for 51 souse tournois, but by exchange it is otherwise, for they will deliuer but 50 souse Tournois, which is 2 li. 10 souse Tournois for a Crowne, and at such price the Crowne, as the taker vp of money can agree with the deliuerer. *Note.*

Example.

5 If I deliuer 340 li. ster. here in London, after 6 s. 4 d. sterling the crowne, to receiue at Roan, or at Paris 50 souse Tournois for euerie crowne, I would know how many Liures Tournois, I shall receiue there for my 340 li. ster? *Answe.* say
if

if 6 s, $\frac{2}{3}$ ster. doe giue me 2 li. $\frac{1}{2}$, Tournois, what will $\frac{6800}{3}$ s. giue, (which is ỹ 340 li. reduced into shil. then multiply and diuide, & you shall find 2684 Liures, $\frac{4}{19}$, which is worth 4 souse $\frac{4}{19}$ Tournois, and so much shall I receiue in Roan or Paris for my 340 li. sterling.

6 If I deliuer in Paris or Roan, or elsewhere in France 1250 Liures Tournois, at 50 souse Tournois the Crowne, to receiue for euery such Crowne 6 s, 3 d, sterling at London. I demaund how much sterling money I shall receiue at London for my 1250 pound Tournois? *Answ.* say, if 2 li. $\frac{1}{2}$, doe giue me 6 s, $\frac{1}{4}$, what will $\frac{2250}{2}$ giue? Multiply and diuide, and you shall find 3125 s. sterling, which maketh 156 li. 5 s. sterling. And so many pounds shall I receiue at London for the sayd 1250 Liures Tournois, after 6 s, 3 d, for euery Crowne of 50 soulze.

The

Chap. 13.
Of the Rule of Alligation, or *mixture.*

The Rule of Alligation is so named for ỹ it teacheth to alligate or binde together diuers parcels of sundry prices, & to know how much you shall take of euery parcell, according to the nũbers of the question, ỹ which Rule is distinct into two parts : as followeth.

The first part of the rule of Alligation, sheweth how to make a mixture of diuers things being of sundry prices: And of the same things so mixed, to know the common price of the said mixture.

Example.

1 A man would mixe 5 bushels of Wheat at 2 s. 8 d. the bushell with 9 bushels of Rie, at 2 s. the bushell, and would know how much the bushell

so

so mixed doth stād him in, ẏ one with the other? *Ans.* for to know the same common price: You must multiply euery thing by his price, and adde all the products together: the which you must diuide by the number of all the things that are to be mixed, and the quotient will answere to the question, as in the foresaid example, I multiply 5 bushels by his price, that is to say, by 2 s, 8 d. and thereof commeth 13 s. 4 d. Likewise I multiply 9 bushels by 2 s. maketh 18 s. both these sums added together, doe make 31 s. 4 d. the which I do reduce into pence: & they make 376 pence. Then I diuide 376 by 14 which is ẏ number of all the bushels, and my quotiēt will be 26 pence and $\frac{6}{7}$, and so much doth one bushell of both the sorts of graine stand him in.

2 If you haue two seuerall things, whereof you would mixe equall portions together, you must adde their prices & take only the $\frac{1}{2}$, if you would

mixe

mixe together equall portions of 3 things you must take $\frac{1}{3}$, and of 4 the $\frac{1}{4}$ and so continuing. as by Example wheat of 2 s 8 d. the bushell, and Rie of 2 s. the bushell beeing mingled by equall portions, I adde 2 s 8 d. and 2 s, together, and they make 4 s, 8 d, whereof the one $\frac{1}{2}$ is 2 s. 4 d, and so much is the value of one bushell of such a mixture. And if there were a portion of Barley at 20 d. then I must add 2 s, 8 d: 2 s, & 20 d together, and they make 6 s, 4 d, whereof the $\frac{1}{3}$ which is 2 s, 1 d, $\frac{1}{3}$ should be the price of one bushell of that mixture.

3 A marchant hath 27 li. waight of large Cloues at 6 s. the li. 15 li, of the middle sort at 2 s, 6 d, the li. And 10 li. of fusse at 2 s, 2 d. the li: when all the same are mixed together, I would know how much the li, is woorth? *Answere.* you must multiply euerie drug by his price, and then diuide the totall summe of the products, by the whole waight of the drugs, and you

Z shall

shall find 51 d. $\frac{1}{26}$, and so much is the li. of that mixture worth.

27	at	6 s.	0 d.		162
15	at	2 s.	6 d.		$37\frac{1}{2}$.
10	at	2 s.	2 d.		$21\frac{2}{3}$.
52					$221\frac{1}{6}$.

4 And if you would mixe $\frac{1}{2}$ large cloues, $\frac{1}{3}$ of middle, and $\frac{1}{4}$ of fust, and you would knowe howe much the pound waight were worth, you must take a nũber, which containeth those parts, as for example 12. whereof the $\frac{1}{2}$ which is 6 shall signify so many li. of large cloues: The $\frac{1}{3}$ which is 4, shalbe so many li. of middell, and ŷ $\frac{1}{4}$ which is 3, shal be so many li. of fust. Then afterwards you must multiply every drug by his price, & divide the totall sum of all the products, by the whole sum of the drugs, & you shall finde 4 s. $\frac{1}{26}$. And so much is 1 li. waight of the mixture.

6. at	6 sh.	0 d.	36
4. at	2 sh.	6 d.	10
3. at	2 sh.	2 d.	06 $\frac{1}{2}$
13.			52 $\frac{1}{2}$

5 And if you would make 100 li. waight of such a mixture, you shall worke by the rule of company & you shall find 46 li. $\frac{2}{13}$ of large cloues, 30 li. $\frac{10}{13}$ of middell. And 23 $\frac{1}{13}$ of fust.

6			6: *Ans.* 46 $\frac{2}{13}$.
4	13.	100	4: *Ans.* 30 $\frac{10}{13}$.
3			3: *Ans.* 23 $\frac{1}{13}$.
13			100

6 A Goldsmith hath 8 li. waight of siluer billion of 7 ounces fine, more 15 li. of 8 ounces : fine, & 13 li, waight of 10 ounces fine, and he will melt al these together, and make of them one masse. The question is to know of what finesse the pound waight is ? *Answ.* you must multiply the number of the waights of euery Billion by his finesse, and therof wil come the

ounces and parts of ounces fine, the which you must add together, & they will make 313 ounces ½ of fine, the same you must diuide by 36 which is the whole sum of the poūd waight of Billion, and you shall find 8 ounce and $\frac{51}{72}$ remayning, which $\frac{51}{72}$ parts of an ounce is worth 14 peny waight & 4 graines, and so much is the pound waight of this mixture worth.

8 *lib.*	*at* 7 *onz.*	*is*	56
15	*at* 8 *onz.* ½	*is*	127 ½.
13	*at* 10 *onz.*	*is*	130
36			313 ½.

7 A Goldesmith hath 3 sortes of Siluer byllion, that is to say, 5 li, 7 oūces 10 peny waight, at 7 ounces ⅓ fine: 12 li 3 oūces at 6 ounces ⅓ fine: And 4 li. at 9 oūces fine. All ye which he wil melte into on masse. The question is to know, of what finesse the poūd waight of that mixture shalbe? *Ans.* you must multiply euery Billion by his finesse, as afore. And adde together

together al the products, and they do amount to 155. $\frac{37}{48}$. Then adde all the waights of the Billions together into one sum, and they make 21 li. $\frac{7}{8}$: diuide then 155 $\frac{37}{48}$, by 21 $\frac{7}{8}$, and your quotient will be 7 ounces and $\frac{1016}{8400}$ remaining, the which $\frac{1016}{8400}$, being brought into peny waights and graines, do make 2 peny waight, 10 graines $\frac{2}{35}$, of a graine fine. So you may perceiue that the same mixture is of 7 ounc. 2d. 10 graines, and $\frac{2}{35}$ of a graine fine, the pound waight.

And here is to be noted, that the reckoning of the waights for Siluer is thus as followeth, that is to say,

1 li. of Troy waight maketh 12 ounces.

1 ounce is diuided in 20 penies waight.

1 peny waight is distributed into 24 graines.

1 graine into 20 smaller parts &c.

And the reckoning for Gold, is thus,

1 ounce of fine Gold without any alloy, is imagined to be 24 karets

1 karett is diuided into 4 graines.

1 grain is parted into 2 halfe grains, or 4 quarters of a graine, &c.

And so into other smaller parts.

8 But if the sayd Goldsmith would put 5 li. waight of Copper with the said Billions, and you would know of what finesse it is, then you must ad the same 5 li with the 21 li. $\frac{7}{8}$, and it maketh 26 $\frac{7}{8}$. Then diuide the aforesayd 155 li. $\frac{37}{48}$, by 26 li, $\frac{7}{8}$, and you shall find 5 oũces fine, and $\frac{8216}{10320}$ remayning, the which $\frac{8216}{10320}$ is worth 15 peny waight, 22 graines and $\frac{6}{43}$. And of that finesse wil the same masse bee.

9 A Goldsmith hath melted 12 li, waight, and 5 ounces of Gold Billion, being of 18 karats fine, with 4 li waight, 4 ounces and $\frac{1}{2}$, at 21 karets fine, I demaund of what finesse is 1 li, waight of ẏ same masse? An.

you

you must multiply the waights (by the karats fine) of each sort, & adde the products together, the same you must diuide by the whole summe of all the waights added together, and your quotiēt wil shew you of what finesse the same is of, as in the former example, I do multiply 12 li. & 5 ounces by 18 karetts, and thereof commeth 223 karetts $\frac{1}{2}$. Likewise I doe multiply 4 li, waight, 4 oūces $\frac{1}{2}$, by 21 karets, and thereof commeth 91 karetts $\frac{7}{8}$ these two summes of karetts I doe adde together & they make 315 karetts $\frac{3}{8}$. Then I do adde 12 li. waight 5 ounc and 4 li, waight 4 ounces and $\frac{1}{2}$ together, & they make 16 li, 9 ounc. $\frac{1}{2}$, the which 9 ounces $\frac{1}{2}$ are $\frac{19}{24}$ parts of a pound: & therefore I diuide 315 $\frac{3}{8}$ by 16 li. $\frac{19}{24}$, and thereof commeth 18 karetts, & $\frac{2520}{3224}$ remaining, which fraction is 3 graines, and $\frac{51}{403}$ parts of a graine. And of that finesse is 1 li. waight of the sayd masse.

A Goldsmith hath melted 10 li, waight, 7 ounces, and $\frac{3}{8}$ of 20 karets

and $\frac{1}{3}$ fine. And 8 li waight, 2 ounces and $\frac{5}{6}$ parts of 23 karetts fine, with 15 li waight, 1 oūce of Siluer. The question is of what finesse is ẏ pound waight of the sayd masse? Answere, you must multiply ẏ waight of euery sort of Gold billion by his alloy, that is to say by his finesse, and adde all the products together: and you shall find 340 karetts $\frac{25}{432}$, then add the waight of the two sorts of Golde billion, with the waight of the Siluer togethers, and thereof will come 33 li. 11 ounces, $\frac{5}{24}$, the which 11 oūces $\frac{5}{24}$ is $\frac{269}{288}$ of a pound waight, then diuide the sayd 340 karrets $\frac{25}{432}$ parts, by 33 pounds $\frac{269}{288}$. And you shall find 10 Karets $\frac{4205}{263874}$. And of the same finesse shall the pound waight of that masse of gould be.

The secōd part of the rule of Alligatiō.

1 A Goldsmith hath 4 sorts of gold The first is worth 30 crownes the pound waight, the secōd is worth 36

crownes

crownes, and the third is worth 42 crownes, and the fourth is worth 45 crownes, and of these 4 sorts he will make a Scepter of 6 pound waight, which shalbe worth 40 crownes the pound. I demaund how much he must take of euery sort ? *Answ.* first you must set down the nūbers wherof you wil make ỹ alligation (which are 30, 36, 42, & 45 orderly the one vnder ỹ other after the same maner, as if you would adde them together: and the cōmon number whereunto you will reduce them, you shal set on the left hand, which common nūber in this example is 40. Then marke which of the sayd 4 numbers, are lesser then that common nūber, and which of them be greater, and with a draught of your pen, euermore linke two nūbers together, so that the one be lesser thē that common number, & the other greater thē it, for two greater, nor two smaller numbers may not be linked together, for they will eyther be lesser or els greater then the com-

commũ number but one greater nũ-ber, and one smaller may be so mixed that they will make the common nũ-ber. And two greater or two smaller nũbers, can neuer make the cõmon number in due order, as héereafter shall appeare.

After ỹ you haue thus linked them, then marke how much each of the lesser numbers is smaller thẽ the cõ-mon number and that difference you shall set against the greater numbers which be linked with those smaller, each of them with his match still on the right hãd. And likewise you must set the excesse of the greater nũbers against the lesser which be combined with them Then shall you adde all those differences into one summe, which shall be the first number in the Rule of thrée, and the second number shalbe the whole massy péece that you wil haue of all the particulers, which in this example was presupposed to be 6 li. Then the third summe shalbe each difference by it selfe, and by thẽ

shall

ſhall you finde out the fourth number, declaring the iuſt portion that you ſhall take of euery particular in that mixture, as now by the former example, I will make it more plaine.

	The prices ſeuerall.	*The differences.*	
The common price 40 *or nūber.*	30	5	*A*
	36	2	*B*
	42	4	*C*
	45	10	*D*
		21	

21. *6.* 5. || 21. *6.* 2.

21. *6.* 4. || 21. *6.* 10.

Heere in this former example, you ſee that I haue ſet downe the ſeuerall prices, which be 30, 26, 42, 45, and haue linked together 30, with 45. & 36, wich 42. The common price 40. I haue ſet on the left ſide, as before is declared, and the difference of it frō

euery

euery seueral price, I haue set on the right hand, against that summe with the which it is linked. So the difference of 30, from 40, is 10, which I set against 45. ẏ he is linked withall, and the difference of 45, aboue 40 is 5, which I haue set against 30. So likewise, the difference of 42, aboue 40, is 2, that I haue set against 36. And the difference betwéene 36 and 40, (which is 4) I haue set against 42. Then I add all those differences together, namely 5, 2, 4, and 10, and they make 21, which I make the first number in the Rule of thrée, and 6 li. which is the waight of the Scepter of Gould the second number, and the third number shalbe euery particular difference for euery seueral working. Then worke by the rule of thrée: saying if 21 (which is all the differences added together) do giue me 6 pound waight, which is the waight of the Scepter, what shall 5 giue, which is the first difference?

I multiply and diuide, and I find 1

li.

li.waight $\frac{3}{7}$, so much must I haue of ẏ first price. Thē I do in like maner wᵗ the rest, & I find $\frac{4}{7}$ of a li. waight of the secōd price, 1 li. $\frac{3}{7}$ of ẏ third price: and 2 li. $\frac{6}{7}$ of the fourth, the which 4 summes being added together, doe make 6 li which is the whole waight of the Scepter that I wold haue. And now to proue if the prices do agrée, you shal do thus: First multiply this totall summe 6 by the common price 40, and it will make 240 crownes, which you shall kéepe by it selfe. And afterward multiply euerye seuerall summe of waight by the price belonging to the same waight, and if that summe do agrée with the first ẏ you kept by it selfe, thē is your work well done, as héere 1 li. $\frac{3}{7}$, is ẏ waight of ẏ sort of Gould which is of 30 crowns price. Therfore multiply 30 by 1 li. $\frac{3}{7}$, & it maketh 42 crownes $\frac{6}{7}$, which you must set down. Then multiply $\frac{4}{7}$ (which is the waight of the second sorte of Gould) by 36 which is the price of ẏ same, and thereof commeth

20 crownes $\frac{4}{7}$: so againe 1 li, $\frac{1}{7}$, multiplyed by 42 Crownes, which is the third price, doth make 48 Crownes. And last of al 2 li, $\frac{6}{7}$, multiplied by 45, maketh 128 crowns $\frac{4}{7}$. All these being added together, doth make 240 crownes agreeable to the former sum of 40, multiplyed by 6. And thus I may affirme that this worke is well done.

2 A Taverner hath foure sorts of wins, of foure severall prices, the first of 8 pence the Gallond, the second of 10 pence the gallond, the third of 15 pence, & the fourth of 18 pence. And hee will mixe all these sorts together, so that the gallond shall be worth but 12 pence. I demaund how many Gallonds he must take of every sort? *Answ.* First suppose the punchen to hold some certaine measure, as to containe 84 Gallonds, and then the forme will be after this sort, as you see hereafter following.

	8	3	
	10	6	
12	15	4	
	18	2	
		15	

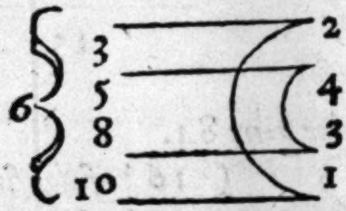
If 15 *doe giue* 84.

What will 3		$16\frac{4}{5}$ *of the first.*
What will 6	*giue?*	$33\frac{3}{5}$ *of the* 2.
What will 4	*They*	$22\frac{3}{5}$ *of the* 3.
What will 2	*make.*	$11\frac{1}{5}$ *of the* 4.
		84

3 A Mint master hath 4 sorts of siluer Billion, of these finesse following. The first is of 3 ounces fine, ẏ second of 5 ounces fine, the third of 8 ounces fine, and the fourth of 10 ounces fine. And of al these 4 sorts, he would make another sort, that should be but of 6 ounc. fine. The questiō is to know what portiō he must take of euery of ẏ said billiōs? *Ans.* Set down the particuler finesse, the one vnder ẏ other, namely 3, 5, 8, and 10, & set 6

which

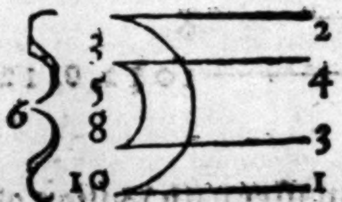
which is the common finesse, before them toward your lefte hand, as heere you may see.



Then put the difference of 3 from 6, right against 10, and the difference of 6 frō 10, which is 4, right against 3. Likewise ẏ differēce of 5 frō 6 which is 1, right against 8: & the difference of 6 from 8, which is 2, right against 5. This done, you shal conclude, that for euery 4 pound waight that he taketh of the billion of 3 ounces fine, he must take 2 li. of the billion of 5 ounces fine, and 1 li. waight of the billiō of 8 ounces fine, & 3 li. waight of ẏ which is of 10 ounces fine. Or els if you please add 4, 2, 1, and 3 together and they make 10, which shal be the denominator of euery of the portiōs

that

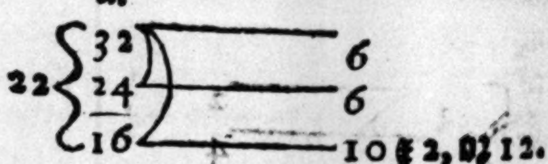
that is to say, you shall take $\frac{4}{10}$ of the Billion of 3 ouces fine $\frac{2}{10}$ of y^e which is of 5 ounc. fine $\frac{1}{10}$ of y^e of 8 ounces fine and $\frac{3}{10}$ of that which is of 10 oũces fine. And so of all such like. And if you would make 60 li. waight of such a mixture, you must adde 4, 2, 1, & 3 together, which maketh 10, and then worke by the rule of cõpany saying, if 10 li. giue 60 li. what will 4 giue? and so likewise, what will 2 giue, &c. This forme may be varied, by cõbining y^e particuler values after this manner as heere you do see and as in the other example, it is plaine.



4 Sometimes the value doth chãge his difference, and is linked vnto diuers, for to represent the portion that is to be takẽ of euery thing, as by ex-

ample. A marchāt hath wheat of 2 s. 8 d. the bushell. Rie of 2 s. & barley of 16 d. the bushell, and he will make a mixture of these sortes which shal stād him but in 22 pence the bushell. It is demaunded how much he may take of euerye sort of the sayd grayne? *Answere.* Put the difference of 22 from 32 and 24, right against the 16 And Likewise ÿ difference of 16 frō 22 right against 32 and against 24. And you shall find for 6 bushels ÿ he taketh of wheat, he must take 6 bushels of Rie, & 12 bushels of Barley.

d.



5. A Mint master hath Billion of 9 ounces 10 penny waight fine, and of the same he wold make mony, which shold be but of 6 ounc. fine, and therfore it behooueth him to melt copper therewith

therewith, which is valued at 0 peny waight of fine. The question is to know how much siluer & copper hée must mixe together: After that you haue put downe 9 unc. $\frac{1}{2}$ for the valure of the siluer, and right vnder the same 0 for the copper, you must take the difference of 6 from 9 $\frac{1}{2}$ which is 3 $\frac{1}{2}$, and place the same summe right against the 0, for to signifie the portiō of copper that he must take: And the difference of 0, from 6, is 6; the same you must set right against 9 $\frac{1}{2}$, which shall represent the portion of siluer that he must take And thus you sée, that for 6 li. of siluer that hée taketh, he must take 3 li $\frac{1}{2}$ of Copper to make the sayd money of 6 ounces fine.

$$6\left\{\begin{array}{ll} 9\frac{1}{2} & 6 \text{ li. sil.} \\ 0 & 3 \text{ li.} \frac{1}{2} \text{ co.} \end{array}\right.$$

And if hée had 3 sorts of Siluer Billiō, that is to say of 6 ounces fine: of 7 ounces fine, and of 9 ounces fine, and hée would make money thereof

which should be but of 5 ounces fine, it behoueth him to mixe copper therwith. And this forme following doth shew how the same must be combined, and likewise how much he must take of euery sort.

5	6		5
	7		5
	9		5
	0		1, 2, 4, all is 7.

6 Likewise, a Mint master hath Billion of Gold, at 19 karets fine, some at 22 karets fine, some at 24 karets, which is full fine without corruption, and he will make coyne thereof, which shalbe 23 karets fine, it is demanded how much he must take of euery sort? *Answere*, make your Alligation as this forme hereunder sheweth.

23	19		1
	22		1
	24		4, 1, all is 5.

More,

More, the sayd master hath gould of 20 karets $\frac{1}{2}$ fine, and of 22 karets fine, and he will allay the same to 18 karets fine. And for to doe the same, it is conuenient for him to mixe siluer therwith, which is estéemed at 0 karets fine, but procéeding according to this Rule, hée shall find that for 18 pound waight, or other portions that he taketh of the 2 sorts of Billion of Gold, he must take 6 li, waight, and $\frac{1}{2}$ of Siluer to allay the same vnto 18 karets fine.

$$18\begin{cases} 20\frac{1}{2} & \text{—— } 18 \\ 22 & \text{—— } 18 \\ 0 & \text{—— } 2\frac{1}{2},4,\text{ ye is } 6\frac{1}{2} \end{cases}$$

7 Againe the sayd Master hath 100 pound waight of Gold at 22 karetts fine, and 20 pound waight at 19 karetts fine, the which he will allay to 20 karets fine The question is whether he ought to mixe any siluer with the same, yea or no, and how much?

 Answe.

Answ. You must consider (by ye first part of the rule of Alligation) the alloy of the 100 li. and of the 20 li. being melted together, & you shall find that the same is of 21 $\frac{1}{2}$ karets fine, & therefore for as much as the same is yet of a better finesse then hee would haue it, he must therfore mixe Siluer therwith, that is to say for 20 pound waight, or portions of gold, hee must take thereto 1 li. $\frac{1}{2}$ of siluer.

$$20\left\{21\tfrac{1}{2}\right.\quad\begin{matrix}20\\ 1\tfrac{1}{2}.\end{matrix}$$

8 If hee had 1 li. waight fine siluer of 12 ounces fine I demaund how much Copper he must mixe with the same, to allay it vnto 11 oūces $\frac{1}{4}$ fine that is to say, to 11 ounces 5 pennie waight fine; make your Alligatiō as before is taught Then diuide the portion of copper, by the portion of fine, and you shall find $\frac{3}{45}$, which being abreuied, is $\frac{1}{15}$. And thus to euery li.

waight

waight of siluer, you must take $\frac{1}{15}$ of a li. of copper, and for euery 11 poūds $\frac{3}{4}$ of siluer, you must take $\frac{1}{4}$ of a li. of copper. And so is to be done with the same, in case that it were of any other alloy.

9 A Master hath 1 li. of fine Gold of 24 karets fine, the which he would allay to 22 karets fine. The questiō is, to know how much siluer must be mixed with ŷ same, that it may be of ŷ finesse of 22 karets as before? Ans. take the differēce of 22 to 24, which is 2. Then diuide 2 by 22, which you cannot, for they are $\frac{2}{22}$, but abbreuie thē, and it is $\frac{1}{11}$. And so much siluer must be mixed with 1 li. waight of fine Gold that the same may be of 22 karets fine.

10 A Goldsmith hath 1 li waight of Siluer billion of 7 oūces fine, it is demaunded how much fine siluer he must put to the same, that being molten together, it may be of 10 ounces

fine, *Answ.* make your alligation of 7, and 12 vnto 10, and then diuide ÿ portion of the fine siluer, by the portion of siluer billion, and you shall find 1 $\frac{1}{2}$: and thus to 1 li waight of 7 ounces fine you must take 1 li. $\frac{1}{2}$ of fine siluer of 12 ounces fine to make the same of 10 ounces fine.

11 A marchant hath giuen order vnto his Factor to employ him 83 li. 6 s. 8 d. ster. in 5 sorts of spices, that is to say in Nutmegs of 80 d. ÿ pound Cloues at 76 d the pound, Sinamon at 52 d, the pound, Ginger at 34 d, ÿ pound, and Pepper at 30 d. the poũd. But he hath not appoynted him the quantitie or portion which he should buy of euery sort, neither yet of al the sorts together, the questiõ is to know how much the factor must buy of euery sort to haue of each of the like quãtity. *Answ.* you must ad 80, 76, 52, 34, and 30 together, and they make 272. Thẽ you must diuide 83 li. 6 s. 8 d. being reduced into pence, namely

ly 20000 d. by 272. and therof cōmeth 73 li. $\frac{0}{17}$. and so many pounds must he buy of euery sort of the said spices.

12 But in case he would not haue so many pounds of the one sort, as hee would haue of the other, then you must take another middell value betweene the said particulers, as for example, let the meane number be 50 d. Then reduce ỳ sayd 83 li. 6 s, 8 d. into pence as the other prices are, & they do make 20000 pence, the same you must diuide by 50 pence, which is the meane or cōmon price, and therof wil come 400 li. And so many pounds must he haue of al the sorts together. Then if you will know how many pounds hee must haue of euery sort you must sett down your particular prices, after the middell valure, that is to say after 50 d. as hereafter followeth: And then worke by the rule of company, and you shall find how much he shall buy of euery sort.

50	80	20	
	76	16	
	52	16	
	34	26	& 2, all is 28.
	30	30	
		110	

110 give 400, what { 20? *An.* 72 $\frac{1}{11}$ / 16? *An.* 58 $\frac{2}{11}$ / 16? *An.* 58 $\frac{2}{11}$ / 28? *An.* 101 $\frac{9}{11}$ / 30? *An.* 109 $\frac{1}{11}$

400

Chap. 14.

Of the Rule of Falshood, or false *positions*.

The Rule of falshood is so named not for ẏ it teacheth any deceit or falshood, but that by fained numbers taken at all adventures, it teacheth to find out the true nũber that is demaunded. And this (of al ẏ vulgar rules which are in practise) is the most

most excellent: This Rule hath two parts, the one is of one false position alone, the other is of two positions, as héereafter shall appeare.

Those questions which are doone by false positions, haue their operations, in a maner like vnto that of the Rule of thrée: but only that in ye rule of thrée, we haue thrée nūbers knowen, and héere in this Rule, wée haue but 1 number that commeth in vse to work by: vnto ye likenes wherof, we must deuise two other numbers, the one multiplying, and the other diuiding, as by example.

1 I haue deliuered to a banket, a certaine summe of pounds in money to haue of him by the yéere simply, 6 li. vpon the 100 li. And at the end of 10 yéeres, he payd me 500 li. for all, both principall and gaine. I demand how much was the principall summe that I deliuered him at the first? Here you sée that there are diuers termes: but the cheife to work withall is 500 li.

li. which commeth of the other numbers, that is to say, of 10, & 100, for of them is composed or made the tenor of the question, the practise whereof is thus.

Let us faine a number at pleasure, and with the same let us make our discourse, euen as though it were the principall summe that we seeke for. As by example. Suppose that I deliuered him at ẏ first 200 li. the which were worth to me in 10 yeares, 120 li after the rate of 6 li. upon the 100 li Then 120 li. added with 200 li. do make but 320 li. and I must haue 500 li. Thus you see that I haue three terms for the Rule of three: the one which shall containe the Question, the other two which I haue formed artificially, which are 200 and 320: in such sort, that 320 ought to haue such proportion to 200, as 530 hath unto the number that I seeke: that is to say, unto the true principall sum, then must I haue recourse unto the Rule of three, after this sort, saying:

If 320 li, become of 200 li. of how much shall come 500 li. I do multiply 500 by 200, and they are 100000, the which I must diuide by 320 li. & thereof commeth 312 li. $\frac{1}{2}$, which is the sum that I deliuered at the first. And thus this rule hath some cõgruence with the double rule of thrée.

2 I haue a Cestren with 3 vnequall cocks, contayning 60 pipes of water: And if the greatest cocke be opened, ÿ water will voide cleane in 1 hower, at ÿ second it will auoid in 2 howers, and at the third it will require thrée howers, now I demaund in what space it will auoide, all the cockes being set open? *Answ.* Suppose that it will auoide in halfe an hower: that is to say, in 30 minutes. Then must there auoide at the first cocke the $\frac{1}{2}$ which is 30 pipes: and by the second cocke the $\frac{1}{4}$, which is 15 pipes, & by the third cocke the $\frac{1}{6}$, that is 10 pipes: all the which summes being added together, do make 55 pipes: but it

 should

should be 60 pipes. Therefore say by the Rule of three, if 55 pipes do voide in 30 minits: in how many minuts will 60 pipes voide? Multiply and diuide and you shal find 32 minuts $\frac{40}{55}$ the which $\frac{40}{55}$ being abbreuied are $\frac{8}{11}$ of a minut, & in that space wil ye water voyd, if all the cocks be set open.

Of the Rule of two false Positions.

The summe of this Rule to two false positions is thus, when any question is proposed appertaining to this Rule. First you must imagine any number at your pleasure, which you shall name the first position, and with ye same you shall work in stead of the true number, as the question doth import, and if you see that you have missed of the true number that you doe seeke: Then is the last number of ye work, eyther to great, or to little, the which number, you shall note with the signe of more or lesse:

for that is the first error, in ẏ which
you haue fayled, the which signes of
more, & lesse, shall be noted with these
figures ✕, —, This figure ✕,
betokeneth more: and this plaine line
—, signifieth lesse: that is to say, ẏ
one signifieth too much, and the other
too little: then you must begin again,
& take another nūber, which shall be
the second position, and worke by the
question as before, if you haue failed
againe, note the excesse or want for ẏ
is the second error. Then shall you
multiply the first position by ẏ secōd
error crosse-wise, and again the secōd
position by the first error (and this
must alwaies bee obserued) and you
must keepe the two products: then if
the signes be both alike, that is to say,
either both too much, or both too lit-
tle, you shall abate the lesser product
from the greater, & likewise you shall
subtract the lesser error from the grea-
ter, and by the remaine of those er-
rors, you shall diuide the residue of ẏ
products, ẏ quotient shal be the true
number

number that you seeke. But if the 2 signes be unlike, that is to say, ẏ one too much, and the other too little, then you shall adde those products together, and likewise you must ad both the errors together, and by the sum of those errors, divide the totall sum of both the products: the quotient shall be the true number that you do seeke and this is the whole Rule, as by these examples following, it will appeare more plaine.

Example.

3 A man lying at the point of death sayd ẏ he had in a certen Coffer 100 duckets the which he bequethed to three of his friends by him named, after this sort. The first must have a certaine portion. The second must have twise so many as the first abating 8 Duckets: and ẏ third must have three times so many as the first lesse by 15 Duckets. Now I demand how many every of them must have

Answere.

Answ. first I doe imagine that ẏ first man had 30 Duckets, then by the order of the question, the second should haue 52, and ẏ third 75. These thrée Summes béeing added together doe make 157. & I should haue but 100 so that this first errour is to much by 57, then I note apart the first positiõ 30, with his error 57 to much after this sort 30, ✕ 57. Therefore I prosecute my work, and I suppose that ẏ first had 24, then by the order of the question, the second should haue 40, & the third 57: these thrée summes being added together, doe make 121, & I must haue but 100, so the second error is 2 much by 21. Therefore I note 24, ✕ 21, vnder the 30, ✕ 57, which was my first position with the error as you may sée in the work on the next side following.

Then I multiply crosswise, 30 (which is the first position) by 21 which is the second error, and thereof commeth 630. Likewise I multiply 24, (which is the second position)

 by

by 57, which is the first erroꝛ, and I find 1368: then because the signes of the errours are both like: that is to saye, both to muche, I must therefoꝛe subtract 630, from 1368 and there wil remain 738 which is the diuidend: agayne I must subtract ŷ lesser errour from the greater, that is to say, 21 out of 57, & there will remain 36, which shall be my diuisoꝛ This done, I diuide 738, by 36, and the quotient wilbe 20, $\frac{1}{2}$.

630.

30. ✕ 57.

24. ✕ 21.

1368. 36.

630.

738.

21
738.
366. (20. $\frac{1}{2}$.
3

20. $\frac{1}{2}$.
33.
46. $\frac{1}{2}$.

100.

The

The which 20 $\frac{1}{2}$, is the iust number of the Ducket, that the first man had for his part . so consequently the second man had 33 Duckets, and the third 46 $\frac{1}{2}$. as by the working afore may appeare.

The like number will also appeare in case the errors were both to little, as in making the two positions by 18, and 20, & you shall finde that ye two errours will be both to little, the firste will bee to little by 15, and the seconde to little by 3 as by perusing this worke, you shall well perceiue.

54.
18.——15.

20. 3.

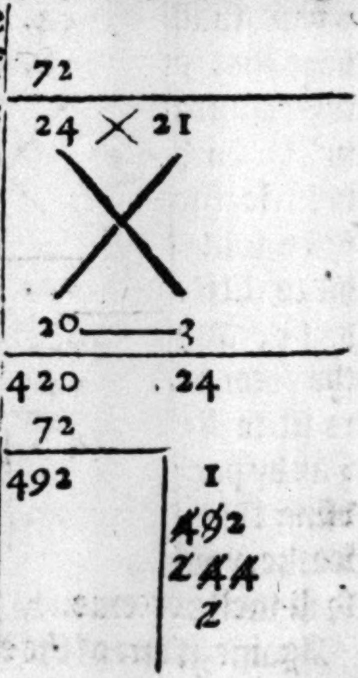
300. 12.
54.

246. | 246(20. $\frac{1}{2}$
122
1

Againe, if one of the errors were to

much, and the other to little, yet you shall haue the true nūber, as before. As if the two positions were 24, and 20, you shall find that the first error will be 21 to much, and the second will be 3 to little. Therfore multiply 24 by 3 crossewise, thereof commeth 72.

Likewise multiply 20 by 21, ẏ product wil be 420. These two summes 72 and 420, you shall adde together, because the signes of the errors be vnlike, and they make 492, ẏ which shall be your diuidend, and againe, adde the lesser error 3, with ẏ greater error 21, and they make 24, for your diuisor,



then diuide 462 by 24, the quotient will bée 20 $\frac{1}{2}$: as before doth plainely appeare.

And now because you shall not forget this part of the Rule, learne this bréefe remembrance following.

The signs both like, subtractiõ do require
And vnlike signes, addition will desire.

The meaning whereof is thus, if both the errors haue like signes, then must the Diuidend and the diuisor be made by subtraction, as is taught before, & if those signes be vnlike, thē must you by additiõ gather the diuidend and the diuisor, as I haue done in this last example.

Another Example.

4 A man hath two siluer Cuppes of vnequal waight, hauing to them both but one couer, the waight whereof is 5 oũces, if ẏ couer be put to the lesser cuppe, it will be in double proportion

vnto the waight of the greater, and the couer being put to the greater cuppe, it will be in triple proportion, vnto the waight of the lesser. I demaund what was the waight of euery cuppe? *A. sw.* Suppose that the lesser cuppe did waigh 7 ounces, then with the couer it must waigh 12 oūces, and this waight should bee in double proportion vnto the greater, therfore the greatest must waigh but 6 ounces adde vnto it 5 oūces for the couer all will be 11 ounces, but it should bee 21, for to haue it in triple proportiō vnto 7, which represēteth the waight of the lesser cup: So that this

105.

7. —— 10.

9. —— 15.

90. 5.

105.

90 | 18 (3 ounces.

15 | 8

this first error is two little by 10, which you shall note after 7 in this sort, 7,———10.

After you shall suppose some other nūber, as 9, and make the like work as before, so you shall find 15 to little for the second error, which you shall put behind 9 with the signe lesse thus ——15, & then work with the rest as aboue is sayd, and you shall find that the lesser Cup weighed three ounces, and consequently the greater Foure ounces.

5 One man demaunded of another in a morning what a clock it was, ẏ other made him this answere if you doe adde (sayth hee) the $\frac{1}{4}$ of the houres which be past since midnight with the $\frac{2}{3}$ of the houres which are to come vntill noone, you shall haue the iust houre, that is to say, you shall know what a clock it was. *Answere.* Suppose that it was 4 a clock in the Morning, so should there remaine 8 vntill noone, then I take the $\frac{1}{4}$ of 4

which is 1, and the $\frac{2}{3}$ of 8 which is 5 $\frac{1}{3}$ and I ad them together, so I find 6 $\frac{1}{3}$, and I supposed but 4 therfore this first error is to much by 2 $\frac{1}{3}$, which I note after my position, thus 4 $\times$ 2 $\frac{1}{3}$: then againe I suppose another number, that is to say 9, so should remain but 3 houres untill none. I take the $\frac{1}{4}$ of 9, and the $\frac{2}{3}$ of 3, which is 2 $\frac{1}{4}$ & 2: these I adde together, and they make 4 $\frac{1}{4}$: but I supposed ye it was 9, therefore the second error is 4 $\frac{3}{4}$ too little, which I note behinde my position thus, 9——4 $\frac{3}{4}$.

And then I multiply crossewise, as before is taught, & because ye signes of ye errors are unlike, that is to say, the one too much, & the other too little, therfore in this

19.

4 $\times$ 2 $\frac{1}{3}$.

9 —— 4 $\frac{3}{4}$.

21.   7. $\frac{1}{12}$.

19.

43.

worke I must add the products, and they

they will be 40. Likewise I must add the errors, and they be $7\frac{1}{12}$. Then I diuide 40 by $7\frac{1}{12}$, and therof cōmeth 5 howres $\frac{11}{17}$, and that houre it was in the morning.

Chap. 15.

Of diuers Questions extraordinarie, euery one of them containing a generall Rule for such like Examples.

1 FIue men diuising of their ages The first sayd to the other, ỳ hee was 120 yeeres of age: the secōd sayd if my yeeres were doubled thē should I haue so many yeeres more than ỳ first man, as the first hath now more than I haue: The third sayd in like maner, if my yeeres were tripled. The 4 said if my yeeres were quadrupled, that is to say, multiplyed by 4: The fifth sayd ỳ if his yeeres were quintupled, that is to say, multiplied by 5, that they shold each of thē haue so many yeeres more than ỳ first man

as

as he hath now more than euery one of thē. The questiō is to know, how ould euery of the other 4 men were? *Answ.* You must take the numbers which are nærest collaterals, in natural order vnto 2, 3, 4, and 5 by reason of dupling, tripling, &c. And the greater of euery of the sayd numbers collaterals, must be your denominator, to the lesser number. As thus the next collaterall numbers vnto 2, are 1 & 3, which is $\frac{1}{3}$. Likewise ẏ next collaterall nūbers to 3 are 2, & 4 which is $\frac{2}{4}$. And so for 4, are 3 & 5, which are $\frac{3}{5}$, and for 5 are 4, and 6 which bée $\frac{4}{6}$, Then if you will knowe the second mans age, you must ad vnto 120 the $\frac{1}{3}$ of it selfe which is 40, al is 160, the same you must diuide by 2 and therof cōmeth 80 yéeres, and so ould was the second man And for to know the age of the third man You must adde vnto 120 his owne $\frac{2}{4}$, that is to say, his $\frac{1}{2}$, which is 60, and they make 180. The sayd summe you must diuide by 3, & therof cōmeth 60 yéeres

for

for the third mans age. And after the same manner, you shall find that the fourth man had 48 yeeres. and the 5 had 40 yeeres. The proofe is very easie.

2 A man hauing his eye sight somewhat altered, beganne to tell and reckon a certaine number of birds to be in all 18. His Companion that had a cleerer sight, beholding well the birds: Answeared him that there were not 18. But said he, if there were twise so many more as there are, there shold be as many more aboue 18. as there be now lesse than 18. The questiō is to know, how many birdes there were in all? *Ans.* You must adde unto 18 his $\frac{1}{2}$, that is to say his $\frac{1}{2}$, & thereof will come 27 the which you shall diuide by 3, and thereof cōmeth 9. And so many birds were there in all.

3 A Draper hath bought 24 sorting cloathes, and he hath sold 100 poūds worth

worth of the same cloathes, vpon the which he hath gained, as much as 1 cloth did cost him. I demaund what 1 of the sayd cloathes did cost him? *Ans.* You must adde 1 vnto 24, and they make 25. Then diuide 100 by 25, and therof will come 4 li. and so much did one cloth cost him.

4 A Mayd carried egges vnto the Market, and it happened a merry fellowe to meete her, who began to iest with her in such sort, that hee ouerthrew her Basket, and brake all her egges, the Mayde being much displeased with him for breaking of the same sayd very earnestly vnto him, ẏ he should pay for them, the man cōsidering with himselfe, that by his folly they were broken, answered ẏ maid that he would pay her for them, and therefore he demaunded of her what nūber she had: The silly poore wench that could not well reckon, sayd vnto him, that shee could not well tell him, but sayd she, when I did put thē

into

into my Basket by 2 and by 2, there remained 1 egge: and when I counted them by 3 and by 3, there remained 1: and when I did reckon thē by 4 and by 4, there remained still 1: but when I did count them by 5 and by 5, there remained none. The questiō is to know how many Egges the mayde had in all? *Answ.* for to doe this, and all such like questions, you must multiply 2, 3, & 4 together: saying, 2 times 3 make 6, and 6 times 4 make 24, unto this number you must add 1, and they make 25. And so many egges she had in all. But if she had had a greater number of eggs that she might haue counted them til she came to 7 and 7, after ẏ same mā-ner as she did, till she came to 5 and 5: you must multiply these numbers 2, 3, 4, 5 and 6 the one by the other, and thereof will come 720, unto ẏ which adde 1, and they make 721. And so many egges she should haue had, if she had counted them by 7 and 7.

5. Againe,

5 Againe, if she had sayd, that when she counted her eggs by 2, & 2, there remained 1: and by 3 and 3; there remained 2, and by 4 & 4, there remained 3: and by 5 and 5, there remained nothing. The question is to know, how many egges shee should haue had? *Ans.* You must finde a number ẏ least that you can possible, which may be diuided by 2, by 3, and by 4, that is to say, 12 is the neerest number, diuide the same by 5, & there remaineth 2. This being done, you must find 2 numbers the least that is possible, which may be diuide by 5, & by 2, in such sort that ẏ nūber which is diuidēd by 2 may exceed (the other that is diuided by 5) onely by 1, and those 2 nūbers are 10, & 6, for if you diuide 6 by 2, your quotient wil be 3 and 10 diuided by 5, bringeth but 2: thē consider that 6 cōtaineth 3 times 2. And therefore you must multiply 12 by 3, and they make 36, from the which you must subtract 1, & there will remaine 35; which is the nūber

that

that is required to be found.

6 And if shée had counted them after the same manner unto 7, and ẏ there had remained nothing then you know that 60 is the neerest number that may be diuided by 2, 3, 4, & 5, 6, the which 60 being diuided by 7 there wil remain 4, and therfore you must find two numbers the least that may be, that can be diuided by 4, & by 7, in such sort, that that number which is diuided by 4, may excéede the other number (by 1,) that is diuided by 7 the which 2 nūbers are 7, and 8, for if you diuide 8 by 4 your quotiēt wil be 2. And diuiding 7 by 7, your quotient wilbe 1, and therfore for because that 8 cōtaineth 2 times 4, you must multiply 60 by 2, and therof cōmeth 120, from the which nūber you shall subtract 1, and the residue which are 119, is the number that is required.

7 A Théefe entring into a Garden, did steale from thence a certen number

ber of Apples : And at his comming forth, he did méet with 3 men, one after another, who threatned to accuse him: and for to appease them, he gaue vnto the first, the $\frac{1}{2}$ of all his apples, who receiued the same with thanks, but he returned him 12 of them back againe. Then he gaue vnto the secõd the $\frac{1}{2}$ of them that he had remaining who receiued ỹ same, but he gaue him back againe 7 apples: and so he gaue vnto the third man, the $\frac{1}{2}$ of the residue who returned him 4. And in the end he had still remaining 20 apples. The question is to know how many apples hée gathered in the sayd Garden? *Answ.* For to do this, you shal subtract 4 from 20, and there wil remaine 16, the same you shal double, & they make 32: frõ ỹ which you must abate 7, and there wil remain 25: the same you shal double, and they make 50: from the which you shall subtract 12, and there will remaine 38, whereof the double which is 76 doth shew the number of apples that hée gathered

red. This and such like questions are easie to be done in going backwa[r]d from the end of the question vn[till] you come to the beginning thereof. But if he had giuen the ⅓ vnto one of them, the ½ vnto another, and ¼ vnto the last, or any other, al the same may be done by the conuerse rule, ÿ is to say, beginning at the end of the question, till you come to the beginning as before is sayd.

8 A Marchant did ride vnto thrée seuerall faires: at the first hée doubled his money and spent 10 crownes, at the second faire he did also double his money and spent 10 crownes; And likewise at the 3 faire, he did double his money and spent 10 crownes, & in the end, he found that he had remaining but 2 crowns. The question is to know, how many crownes hée had at ÿ first: *Ans.* for to do this, you must add vnto 10 crownes, the two crownes which hée had remaining, and they make 12, whereof you shall

take the $\frac{1}{2}$ which is 6 : againe adde 6 to 10, and they make 16, whereof you shall take the $\frac{1}{2}$, which is 8: finally you shall adde 8 vnto 10, and they make 18, whereof you must take the $\frac{1}{2}$ which is 9: and so he had 9 crowns at the first.

9 A Burgesse would distribute a certaine sum of pence vnto diuers poore men equally : but after that he had counted how many they were in number: he perceiued that if he should giue vnto euery man 6 d, hée should want 14 pence. But if he should giue euerie man 5 d, the péece, he should haue 9 pence remaining. The questiō is, to know the number of the poore men? Ans. for to doe this, and such like questions, you must haue in remembrāce this principle, more from more, or lesse from lesse, &c. which is sette forth in 2 verses in the Rule of false positions, ỹ is to say, you must ad the lesse with the more. Namely 14 with 9, and they make 23: and diuide

uide the same sum by the difference which is of 5 from 6 that is 1. And therefore you must diuide 23 by 1, but 1 doth neither multiply nor diuide, therefore you may conclude, and say that there were 23 poore men.

10 And if he should giue to euerie man 5 pence, he should haue 19 pẽce remaining, and giuing euery man 7 pence he should haue 3 pence ouer: In this case you must abate more frõ more, that is to say, 3 from 19 and ẏ rest which is 16, you must diuide by 2 which is the difference of 5 from 7: & the quotient which is 8, doth shew you the nũber of the poore men: and likewise if ẏ he had had both wants, that is, if both the numbers had béen to little, you must haue done with them as you did with the others that were both more.

11 A man hath giuen vnto 20 worke folks 20 s. that is to say, vnto men, women, and boyes: vnto men

he gaue 20 pence a péece vnto wo-
men 15 pence, & vnto boyes he gaue
8 pence. The question is to know,
how many men? how many women?
& how many boyes there where in al?
Answ. First you must take the diffe-
rence of 8 from 15, and also from 20:
and you shall haue 7 for the differēce
of the woman: & 12 for ẏ of the man:
this done you may suppose that there
were 20 boyes, the which at 8 pence
the péece maketh 160: the which you
must abate from 20 s. béeing reduced
into pence, that is from 240 pence: &
there will remain 80 pence, ẏ which
80 you shall diuide into 2 such parts
that ẏ one may be diuided by 7, & the
other by 12, and that nothing may
remaine after the diuisions are made.
The which 2 nūbers are 56, and 24:
For 56 being diuided by 7, bringeth
into the quotient 8, and 24 being di-
uided by 12, will bring in the quoti-
ent 2: which sheweth that there was
8 women, 2 men. And the rest of the
20, which are 10 were boyes, so there
were

were 8 women 2 men, and 10 boyes. Some men do call this Rule the virgins Rule.

Chap. 16.

Of sports and pastime, done by *number.*

IF you would know yͤ nūber that any man doth think or imagine in his mind as though you could deuine.

Bidde him triple the same number, then of the product let him take the $\frac{1}{2}$ if the number be euen or els the greater halfe, if the same be odde, then bid him triple againe the sayd $\frac{1}{2}$: after say to him that he shall put away if he cā from the last nūber being tripled: 36, 27, or 9, that is to say, cause him subtelly to put away 9 as many tims as is possible and keepe the nōber secreatly: and whē he can no more take away 9: then to know if yͤ yet thers remain any number, bid him abate 3

2 or 1 if he can: this done sée how many times 9 you haue caused him to abate, for the which kéepe you in mind so many times 2, & if that you know that he had any thing remayning besides the nines, the same shall also note vnto you 1.

Example.

Suppose that he thought 6 which being tripled is 18, wherof the ½ is 9 the triple, of ẏ is 27: now cause him to abate 18, or 9 or 27: and againe 9, but then he will say vnto you that he cannot, bid him the abate 3, or 2, or 1, he wil say also that he cãnot wherfore considering that you haue made him to abate 3 times 9 iustly, you shall tell him that he thought 6, for 3 tims 2 maketh 6. If he had thought 5 the triple therof is 15, whereof the greater ½ is 8, ẏ triple of that maketh 24 which containeth 2 times 9, they are worth 4, and the remaine signifieth 1, ẏ which added together make

5 which is the nūber that he thought.

2 If in any companie, one of them hath a Ring vpon his finger, and you would know by manner of deuining who hath the same & vpon what finger, and what ioynt: cause the persōs to sit down in order, & kéepe likewise an order of thrée fingers: thē seperate your selfe from them in some certain place, and say vnto one of the lookers on, that he double the number (marking well in your minde the order) of him that hath the Ring: and vnto the double bid him adde 5, and then cause him to multiply this addition by 5, and vnto the product bid him adde the number of the finger of the person which hath the Ring: Suppose that the same last summe did amount to 89, then afterward say to him that he put after ẙ same last nūber toward his right hand a figure signifying vppon which of the ioynts he hath the Ring, as if it be vpon the third ioynt, let him put 3 after 89, & it wilbe 893, this don you shall aske

him what nūber he kéepeth, from the
which you shal abate 250, & you shal
haue thrée figures remaining at the
least. The first toward your left hād
shall signifie the number of the persō
which hath the King. The second or
middle figure shall represent the nū-
ber of the finger. And the last figure
toward your right hand, shall beto-
ken the number of the ioynt. As if the
number which he did kéepe were 883
from that you shal abate 250, & there
will remain 643, which do note vnto
you that the first persō hath the King
vpon the fourth finger, and vpon his
third ioynt.

But note that when you haue made
your subtraction, if there do remain a
cipher in the place of tens, that is to
say, in the second place, you must thē
abate 1 from that figure which is in ẏ
place of hundreds, that is to say, from
the figure which is next your left
hand, & that shall be worth 10 tēths,
signifying the tenth finger: as if there
should remaine 703, you must say,
that

that the first person (vpon his tenth finger, and vpon his third ioynt) hath the King.

3 And after ẏ same manner, if a man do cast thrée dice, you may know the points of euery one of them, for if you do cause him to double ẏ points of one die, and vnto the double to ad 5, and the same sum to multiply by 5, & vnto the product adde the points of one of the other dice, and behind ẏ number toward the right hand, to put the figure which signifieth the poynts of the last die, and then shall you aske him what nūber he kéepeth, from the which abate 250, and there will remain 3 figures: which do note vnto you the points of euerie die.

4 Likewise, if thrée of your companions to say, Peter, James, & John would (in your absence) giue themselues euerie one a contrarie name: as for example: Peter wold be called a king, James a Duke, and John a County: And you wold deuine which of them is called a King, which the Duke

Duke and which the County. Take 24 stons, or other peeces whatsoeuer and giue vnto Peter 1, vnto James 2, & vnto John 3, or otherwise. But marke well vnto which of them you haue giuen 1, vnto which 2, and vnto whome 3. Then leauing the 18 stones (before them) that are remining, you shal absent your selfe from their sight, or else turne your face frō thē, saying thus vnto them, whosoeuer nameth himselfe a King: for euery stone ỹ I gaue him, let him take 1 of the residue, and he that nameth himselfe a Duke, for euery stone that I gaue him let him take 2 of thē that remaine, and he that calleth himselfe a Coūty, for euery stone that I gaue him let him, take 4: this being done approach neere them, & marke how many stones are remaining: & know this, that there cannot remaine any other number, but one of these sixe, 1, 2, 3, 5, 6, 7, for the which six nūbers we haue chosen to euery of thē a seuerall name which are these: *Angeli*,

Beati, *Taliter*, *Messias*, *Israell*, *Pietas*: eace of them containing thrée vowels *a*, *e*, *i*, which doe shew the names by order: That is to say, the vowell *a*, sheweth which is the King, the vowell *e*, telleth which is the Duke, and the vowell *i*, sheweth which is ẏ Countie: in following ẏ order how, and to whome you haue giuen one stone, to whom 2, & to which 3, their there do remaine but one stone, the first name *Angeli*, (by these 3 vowels a, e, i,) sheweth that Peter is ẏ king, Iams the Duke, and Iohn the Coūty. And if there do remain 2 stones, ẏ second name *Beati*, shal shew you by these 3 vowels a, e, i, that Peter is ẏ Duke, James the King, and Iohn ẏ County. And so of the other, as by this table doth plainely appeare.

1	2	1	2	3	3
2	1	3	3	1	2
3	3	2	1	2	1
a	e	a	e	i	i
e	a	i	i	a	e
i	i	e	a	e	a
1	2	3	5	6	7
A	*B*	*T*	*M*	*I*	*P*

FINIS.

The agreement of the Measures, and Waights of diuers countries, the one with the other, being reduced *to an equality, and drawne into Tables, as followeth.*

London.

100 elles at Londō do make at.

Antwarpe.	166 $\frac{2}{3}$.
Nuremberge.	174 $\frac{1}{6}$.
Franckf. Liebsig. & Preslaw.	208 $\frac{1}{3}$
Dantzicke.	138 $\frac{1}{3}$.
Vienne in Austri.	145.
Lyons in France.	101 $\frac{2}{3}$. aulnes.
Paris in France.	095.
Rouan in Norm.	086 $\frac{2}{3}$.
Lishburne.	100 vares.
Siuell & other places in Spay.	135.
The Isles of Madere.	103 $\frac{1}{3}$.
Venice.	180 braces.
Lucques.	200 braces.
Florence.	204 $\frac{1}{6}$ braces.
Millan.	230.
Geanes.	480 $\frac{5}{6}$ paulms.

The like agreement hath 125 yards, vnto the measures aforesaid.

The agreement of the measure at Antwarpe with the measures *at other places.*

Antwarpe.

100 elles at Andwarpe do make at.

London, yardes	75, & 60 elles.
Nuremberge,	104 $\frac{1}{2}$.
Franckford, &c.	125.
Dantzicke,	83.
Vienne, &c.	87.
Lyons,	60 aulnes.
Paris,	57.
Rouane,	52.
Lishborne,	60 varies.
Siuell &c.	81.
The Isles, &c.	62.
Venice,	108 braces.
Lucques,	120.
Florence,	122 $\frac{1}{2}$.
Millan,	138.
Geanes,	288 $\frac{1}{3}$ paulmes.

The agreement of the measure at Nurẽberge with the measures at other places.

Nuremberge.

100 elles at Nurẽberge doe make at.	London,	57 $\frac{2}{5}$	elles.
	Andwarpe,	95 $\frac{3}{5}$.	
	Franckford, &c.	119 $\frac{3}{5}$.	
	Dantzicke,	79 $\frac{1}{2}$.	
	Vienne, &c.	83 $\frac{1}{4}$.	
	Lyons,	58 $\frac{2}{3}$	aulnes.
	Paris,	54 $\frac{1}{2}$.	
	Rouane,	49 $\frac{3}{4}$.	
	Lishborne,	57 $\frac{2}{5}$	varies.
	Siuell, &c.	77 $\frac{1}{2}$.	
	The Iles, &c.	58 $\frac{1}{3}$.	
	Venice,	103 $\frac{1}{3}$	braces.
	Lucques,	114 $\frac{2}{5}$.	
	Florence,	117 $\frac{1}{5}$.	
	Millan,	132.	
	Geanes,	267.	paulmes.

The agreement of the measure at Franckeford, &c. with the measures at other places.

Franckeford, &c.

100 elles at Frāckford, &c. do make at.	London,	48 elles.
	Antwarpe	80.
	Nuremberge	83 $\frac{3}{5}$.
	Dantzicke.	66 $\frac{2}{5}$.
	Vienne &c.	69 $\frac{3}{5}$.
	Lions	58 $\frac{4}{5}$ aulnes.
	Parris	45 $\frac{3}{5}$.
	Rouan	41 $\frac{3}{5}$.
	Lishborne	48 vares.
	Sivell,	64 $\frac{4}{5}$.
	The Isles &c.	49 $\frac{1}{5}$.
	Venice,	86 $\frac{2}{5}$. braces.
	Lucques,	96.
	Florence,	98 $\frac{2}{5}$.
	Millan.	110 $\frac{2}{5}$.
	Geanes.	230 $\frac{4}{5}$. paulmes.

The agreement of measure at Dantzicke, with the measures *at other places.*

Dantzicke.

100 elles at Dantzicke doe make at.

London,	72 $\frac{1}{4}$	elles.
Antwarpe	120 $\frac{1}{2}$.	
Nuremberge	125 [illegible].	
Franckeford	150 $\frac{5}{8}$.	
Viennis &c.	107 $\frac{1}{2}$.	
Lions	73 $\frac{1}{2}$	aulnes.
Parris	68 $\frac{5}{8}$.	
Rouan	62 $\frac{5}{8}$.	
Lishborne	72 $\frac{1}{4}$	vares.
Sivell &c,	97 $\frac{1}{2}$.	
The Isles &c.	74 $\frac{5}{8}$.	
Venice,	130.	braces.
Lucques,	144. $\frac{1}{2}$.	
Florence,	147. $\frac{1}{2}$.	
Millan.	166. $\frac{1}{4}$.	
Geanes.	347. $\frac{1}{2}$.	paulmes.

Thomas Beney

The agreemēt of the measure at at Vienne, with the measures *at other places.*

Vienne in Austrice.

100 elles at Viēne doe make at

London,	68 $\frac{9}{10}$ elles.
Antwarpe,	114 $\frac{9}{10}$.
Nuremberge,	120.
Franckforde &c.	143 $\frac{5}{8}$.
Dantzicke,	95 $\frac{3}{8}$.
Lyons,	70 $\frac{1}{10}$ aulnes.
Paris,	65 $\frac{1}{2}$.
Rouan,	59 $\frac{3}{4}$.
Lishburne,	68 $\frac{9}{10}$ vares.
Siuell &c.	93 $\frac{8}{10}$.
The Isles, &c.	71 $\frac{1}{4}$.
Venice,	124 $\frac{1}{8}$ braces.
Lucques,	137 $\frac{9}{10}$.
Florence,	140 $\frac{4}{5}$.
Millan,	158 $\frac{3}{5}$.
Geanes,	331 $\frac{1}{3}$ paulmes.

The agreement of the measure at Lyons, agreeing with the measures at other places.

Lyons.

100 aulnes at Lyons, doe make at	London,	98 $\frac{1}{3}$	elles.
	Antwarpe,	163 $\frac{7}{8}$.	
	Nuremberge,	171 $\frac{1}{4}$.	
	Franckeford, &c.	204 $\frac{5}{6}$.	
	Dantzicke,	136.	
	Vienne,	142 $\frac{1}{2}$.	
	Paris,	93 $\frac{2}{3}$	aulnes.
	Rouan,	85 $\frac{1}{4}$.	
	Lishburne,	98 $\frac{1}{3}$	vares.
	Sivell	132 $\frac{3}{4}$.	
	The Isles, &c.	101 $\frac{3}{5}$.	
	Venice,	177	braces.
	Lucques,	296 $\frac{2}{3}$.	
	Florence,	200 $\frac{3}{4}$.	
	Millan,	226 $\frac{1}{5}$.	
	Geanes,	472 $\frac{7}{8}$	paulmes.

The agreemēt of the measure at Paris, with the measures *at other places.*

Paris.

100 aulnes at Paris, doe make at	London,	105 $\frac{1}{4}$ elles.
	Antwarpe,	175 $\frac{2}{5}$.
	Nuremberge,	183 $\frac{1}{3}$.
	Franckford &c.	219 $\frac{1}{4}$.
	Dantzicke,	145 $\frac{3}{5}$.
	Vienne,	152 $\frac{3}{5}$.
	Lyons,	107 aulnes.
	Rouan,	91 $\frac{1}{5}$.
	Lishburne,	105 $\frac{1}{4}$ vares.
	Siuell &c.	142.
	The Isles, &c.	108 $\frac{3}{4}$.
	Venice,	189 $\frac{2}{5}$ braces.
	Lucques,	210 $\frac{1}{2}$.
	Florence,	214 $\frac{7}{8}$.
	Millan,	242.
	Geanes,	506 $\frac{1}{8}$ paulmes.

The agreement of the measure at Rouan, with the measures *at other places.*

Rouan.

100 aulnes at Rouan, doe make at

London,	115 $\frac{3}{8}$	elles.
Antwarpe,	192 $\frac{1}{4}$.	
Nuremberge,	200 $\frac{1}{8}$.	
Franckeford, &c.	240 $\frac{3}{8}$.	
Dantzicke,	159 $\frac{3}{5}$.	
Vienne,	167 4.	
Lyons,	117 $\frac{1}{4}$	aulnes.
Paris,	109 $\frac{3}{5}$.	
Lishburne,	115 $\frac{3}{8}$	vares.
Siuell	155 $\frac{3}{4}$.	
The Isles, &c.	119 $\frac{1}{5}$.	
Venice,	207 $\frac{2}{3}$	braces.
Lucques,	230 $\frac{3}{4}$.	
Florence,	235 $\frac{1}{2}$.	
Millan,	265 $\frac{3}{8}$.	
Geanes,	554 $\frac{4}{5}$	paulmes.

The agreement of the measure at Lishburne, with the measures *at other places.*

Lishburne.

100 vares at Lishburne, do make at

London	100 elles.
Antwarpe,	196 $\frac{2}{3}$.
Nuremberge,	174 $\frac{1}{6}$.
Franckeforde, &c.	208 $\frac{1}{3}$.
Dantzicke,	138 $\frac{1}{3}$.
Vienne.	145.
Lyons,	101 $\frac{2}{3}$ aulnes.
Paris,	095.
Rouan,	086 $\frac{2}{3}$.
Siuell, &c.	135 vares.
The Isles, &c.	103 $\frac{1}{3}$.
Venice,	180 braces.
Lucques,	200.
Florence,	204 $\frac{1}{6}$.
Millan,	230.
Geanes,	480 $\frac{5}{6}$ paulmes.

The agreemẽt of the measure at Siuell, &c. with the measures *at other places.*

Siuell &c.

100 vares at Siuell, do make at

London,	74 elles.
Antwarpe.	$123 \frac{7}{16}$.
Nuremberge,	129.
Franckford, &c.	$154 \frac{5}{19}$.
Dantzicke.	$102 \frac{7}{16}$.
Vienne,	$107 \frac{3}{8}$.
Lyons,	$75 \frac{1}{4}$ aulnes.
Paris,	$70 \frac{3}{8}$.
Rouan,	$64 \frac{3}{8}$.
Lishburne.	74 vares.
The Isles, &c.	$76 \frac{1}{2}$.
Venice,	$133 \frac{1}{3}$ braces.
Lucques.	$148 \frac{1}{8}$.
Florence,	$151 \frac{3}{16}$.
Millan.	$170 \frac{3}{8}$.
Geanes.	$356 \frac{1}{4}$. paulmes.

The agreement of the measure at the Isles of Madere, with the measures at other places.

Isles of Madere.

100 vares at ye Isles of Madere, do make at

London	96 $\frac{3}{4}$ elles.
Antwarpe,	161 $\frac{1}{4}$.
Nuremberge,	168 $\frac{1}{4}$.
Franckeforde, &c.	201 $\frac{1}{2}$.
Dantzicke,	133 $\frac{5}{6}$.
Vienne.	140 $\frac{1}{3}$.
Lyons,	98 $\frac{1}{3}$ aulnes.
Paris,	91 [illegible].
Rouan,	83 $\frac{5}{6}$.
Lishburne,	96 $\frac{3}{4}$ vares.
Siuell, &c.	130 $\frac{3}{5}$.
Venice,	174 braces.
Lucques,	193 $\frac{1}{2}$.
Florence,	197 $\frac{1}{2}$.
Millan,	222 $\frac{1}{7}$.
Geanes,	465 $\frac{1}{4}$ paulmes.

The agreemẽt of the measure at Venice, with the measures *at other places.*

Venice.

100 braces at Venice, do make at	London,	55 $\frac{1}{2}$	elles.
	Antwarpe.	92 $\frac{1}{2}$.	
	Nuremberge,	96 $\frac{3}{4}$.	
	Franckford, &c.	115 $\frac{3}{4}$.	
	Dantzicke.	76 $\frac{4}{5}$.	
	Vienne,	80 $\frac{1}{2}$.	
	Lyons,	56 $\frac{1}{4}$	aulnes.
	Parris,	52 $\frac{3}{4}$.	
	Rouan,	48 $\frac{1}{8}$.	
	Lishburne,	55 $\frac{1}{2}$	vares.
	Siuell, &c.	75.	
	The Isles, &c.	57 $\frac{1}{5}$.	
	Lucques.	111	braces.
	Florence,	113 $\frac{2}{5}$.	
	Millan.	127 $\frac{3}{4}$.	
	Geanes.	267 $\frac{1}{8}$.	paulmes.

Jn^o Bird

The agreemẽt of the measure at Lucques, with the measures *at other places.*

Lucques.

100 braces at Lucques do make at

London.	50	elles.
Antwarpe,	83 $\frac{1}{3}$.	
Nuremberge,	76.	
Franckford, &c.	104 $\frac{1}{6}$.	
Dantzicke,	69 $\frac{1}{6}$.	
Vienne,	72 $\frac{1}{2}$.	
Lions,	50 $\frac{5}{6}$	aulnes.
Paris,	47 $\frac{1}{2}$.	
Rouan,	43 $\frac{1}{3}$.	
Lishborne,	50	vares.
Sivell, &c.	67 $\frac{1}{2}$.	
The Isles, &c.	51 $\frac{2}{3}$.	
Venice,	90	braces.
Florence,	102.	
Millan.	115.	
Geanes.	240 $\frac{1}{3}$.	paulmes.

The agreement of the measure at Florence, with the measures *at other places.*

Florence.

100 braces at Floréce, doe make at

London,	49 elles.
Antwarpe.	$81\frac{5}{8}$.
Nuremberge,	$85\frac{1}{4}$.
Franckeford, &c.	102.
Dantzicke,	$67\frac{3}{4}$.
Vienne	71.
Lyons,	$49\frac{3}{4}$ aulnes.
Paris,	$46\frac{1}{2}$.
Rouan,	$42\frac{2}{5}$.
Lishborne,	49 vares.
Siuell, &c.	$42\frac{2}{5}$.
The Isles, &c.	$50\frac{3}{5}$.
Venice,	$88\frac{1}{6}$.
Lucques,	$97\frac{7}{8}$.
Millan,	$112\frac{3}{5}$.
Geanes,	$235\frac{1}{2}$.

The agreemẽt of the measure at Millan, with the measures *at other places.*

Millan.

100 braces at Millan, do make at	London.	43 $\frac{2}{7}$ elles.
	Antwarpe,	72 $\frac{3}{5}$.
	Nuremberge,	75 $\frac{5}{8}$.
	Franckford, &c.	90 $\frac{1}{2}$.
	Dantzicke,	60 $\frac{1}{8}$.
	Vienne,	63.
	Lions,	44 $\frac{1}{5}$ aulnes.
	Paris,	41 $\frac{1}{4}$.
	Rouan,	37 $\frac{2}{3}$.
	Lishborne,	43 $\frac{2}{7}$ vares.
	Siuell, &c.	58 $\frac{2}{5}$.
	The Isles, &c.	44 $\frac{7}{[illegible]}$.
	Venice,	78 $\frac{3}{4}$ braces.
	Lucques,	86 $\frac{7}{8}$.
	Florence,	88 $\frac{3}{4}$.
	Geanes.	209 paulmes.

The agreement of the measure at Geanes, with the measures *at other places.*

Geanes.

100 palmes at Geans doe make at

London,	20 $\frac{3}{4}$	elles.
Antwarpe.	34 $\frac{3}{5}$.	
Nuremberge,	36 $\frac{4}{5}$.	
Franckeford, &c.	43 $\frac{1}{6}$.	
Dantzicke,	28 $\frac{3}{4}$.	
Vienne	30 $\frac{1}{8}$.	
Lyons,	21 $\frac{1}{8}$	aulnes.
Paris,	19 $\frac{3}{4}$.	
Rouan,	18.	
Lishborne,	20 $\frac{3}{4}$	vares.
Siuell, &c.	28.	
The Isles, &c.	21 $\frac{2}{5}$.	
Venice,	37 $\frac{2}{3}$	braces.
Lucques,	41 $\frac{1}{2}$.	
Florence,	42 $\frac{2}{3}$.	
Millan,	47 $\frac{2}{4}$.	

The agreement of the waights of diuers Cuntries, the one with the other being reduced to an Equality, and drawn into Tables, as followeth.

London.

112 li. waight at Lõdõ, doe make at

Andwarpe,	107 $\frac{5}{8}$.
Franckford,	99.
Collen & Ausberge,	102 $\frac{1}{4}$.
Nuremberge,	100 $\frac{1}{8}$.
Rouan,	098.
Lyons,	118 $\frac{1}{2}$.
Paris,	102 $\frac{1}{4}$.
Diepe,	100 $\frac{1}{4}$.
Geneue,	90 $\frac{3}{8}$.
Toulouse,	122 $\frac{3}{4}$.
Rochell,	124 $\frac{7}{8}$.
Marseilles,	124 $\frac{1}{4}$.
Seuill, &c.	109 $\frac{3}{4}$.
Venice sut: wai.	166 $\frac{7}{8}$.
Venice gross wa:	105 $\frac{3}{8}$.
Aquilla,	157 $\frac{1}{4}$.
Vienne,	89 $\frac{3}{8}$.
Preslawe,	134 $\frac{5}{8}$.
Liebzig,	101 $\frac{1}{4}$.
Dantzig,	129 $\frac{1}{4}$.
Lubeck,	97 $\frac{3}{8}$.
Barcellone	143 $\frac{1}{2}$.
Lishburne, &c.	99.
Geanes,	157 $\frac{1}{4}$.

The agreemēt of the waight at Antwarpe, with the waights *at other places.*

Antwarpe.

100 li. waight at Antwarpe, doe make at	London,	104 li.
	Franckeford.	$91\frac{7}{8}$.
	Collen, &c,	$94\frac{7}{8}$.
	Nuremberge;	093.
	Rouan,	091.
	Lyons,	110.
	Paris,	$96\frac{1}{4}$.
	Diepe,	93.
	Geneua,	84.
	Toulouse,	114.
	Rochell,	116.
	Marseilles	$115\frac{1}{4}$.
	Siuell,	$101\frac{7}{8}$.
	Venice, &c.	155.
	Venice, &c.	$97\frac{3}{4}$.
	Aquila,	146.
	Vienne,	83.
	Preslaw,	125.
	Liebzig,	094.
	Danzig,	120.
	Lubecke,	$90\frac{1}{4}$.
	Barcellone,	$133\frac{1}{4}$.
	Lishburne,	$84\frac{1}{2}$.
	Geanes.	146.

The agreement of the waights at Franckeford, with the waighsts *at other places.*

Franckeford.

100 li. waight at Fräckforde, doe make at	London,	113 $\frac{1}{8}$.
	Andwarpe,	108 $\frac{3}{4}$.
	Collen &c.	103 $\frac{1}{4}$.
	Nuremberge,	102 $\frac{1}{8}$.
	Rouan,	099.
	Lyons,	119 $\frac{5}{8}$.
	Paris,	103 $\frac{1}{4}$.
	Diepe,	101 $\frac{1}{4}$.
	Geneue,	91 $\frac{1}{4}$.
	Toulouse,	124.
	Rochell,	126 $\frac{1}{8}$.
	Marseilles,	125 $\frac{1}{2}$.
	Seuill, &c.	110 $\frac{3}{4}$.
	Venice sut: wai.	168 $\frac{1}{2}$.
	Venice gros. wa:	106 $\frac{2}{8}$.
	Aquilla,	158 $\frac{1}{4}$.
	Vienne,	090 $\frac{1}{4}$.
	Preslawe,	135 $\frac{7}{8}$.
	Liebzig,	102 $\frac{1}{4}$.
	Dantzig,	130 $\frac{1}{2}$.
	Lubeck,	098 $\frac{1}{4}$.
	Barcellone	144 $\frac{7}{8}$.
	Lishburne,	100.
	Geanes,	158 $\frac{1}{4}$.

The agreement of the waight at Collen, and at Ausberge, with the *waights at other places.*

At Collen, and Ausberge.

100 li. waight at Collē & Ausberg, doe make at

London,	109 1/2.
Antwarpe.	105 1/4.
Franckeford,	096 3/4.
Nuremberge,	097 7/8.
Rouan,	095 3/4.
Lyons,	115 7/8.
Paris,	100.
Diepe,	098.
Geneua,	088 1/2.
Toulouse,	120.
Rochell,	122 1/8.
Marseilles	121 2/3.
Siuell,	107 1/2.
Venice, &c.	163 1/5.
Venice, &c.	103.
Aquila,	153 2/4.
Vienne,	[illegible]87 1/4.
Preslaw,	[illegible]01.
Liebzig,	[illegible]99.
Danzig,	126 5/8.
Lubecke,	[illegible]95 1/4.
Barcellone,	140 1/4.
Lishburne,	096 2/4.
Geanes.	153 3/4.

Th

The agreement of the waight at Nuremberge, with the waights *at other places.*

Nuremberge.

100 li. waight at Nurẽberge, doe make at

London,	110 $\frac{3}{4}$.
Antwarpe,	107 $\frac{1}{2}$.
Franckford &c.	098 $\frac{7}{8}$.
Collen &c.	102.
Rouan,	097 $\frac{7}{8}$.
Lyons,	118 $\frac{1}{4}$.
Paris,	102.
Diepe,	100 $\frac{1}{8}$.
Geneua,	090 $\frac{3}{4}$.
Toulouse,	122 $\frac{3}{8}$.
Rochell,	124 $\frac{1}{8}$.
Marcellis,	124.
Siuell,	109 $\frac{1}{2}$.
Venice. &c.	166 $\frac{5}{8}$.
Venice, &c.	105 $\frac{1}{8}$.
Aquila,	157.
Vienne,	089 $\frac{3}{4}$.
Preslaw,	134 $\frac{3}{8}$.
Liebzick	101 $\frac{1}{8}$.
Dantzicke,	129.
Lubecke,	097 $\frac{1}{4}$.
Barcellone,	143 $\frac{3}{4}$.
Lishburne,	098 $\frac{7}{8}$.
Geanes,	157

Es

The agreement of the waights at Rouan, with the waights *at other places.*

Rouan.

100 li. waight at Rouan doe make at

London,	114 1/4.
Antwarpe,	109 7/8.
Franckeford,	101.
Collen etc.	104 1/4.
Nuremberge,	102 1/8.
Lyons,	120 7/8.
Paris,	104 1/4.
Diepe,	102 1/8.
Geneua,	092 1/4.
Toulouse,	125 1/4.
Rochell,	127 1/4.
Marcellis,	126 3/4.
Siuell	112.
Venice, etc.	170 1/4.
Venice, etc.	107 1/2.
Aquila,	160 3/4.
Vienne,	091.
Preslaw,	137 1/4.
Liebzig,	103 1/4.
Dantzicke,	131 7/8.
Lubecke,	099 3/4.
Barcellone,	146 1/4.
Lishburne,	101.
Geanes,	160 1/4.

The agreement of the waight at Lyons, with the waights *at other places.*

Lyons.

100 Li. waight at Lions, doe make at	London,	94 1/2.
	Antwarpe,	90 7/8.
	Franckford &c.	83 1/2.
	Collen &c.	86 1/4.
	Nuremberge,	84 1/2.
	Rouan,	82 1/2.
	Paris,	86 1/4.
	Diepe,	84 1/2.
	Geneua,	76 1/4.
	Toulouse,	103 1/2.
	Rochell,	105 1/4.
	Marcellis,	104 3/4.
	Siuell,	92 1/2.
	Venice. &c.	140 3/4.
	Venice, &c.	88 1/8.
	Aquila,	132 1/2.
	Vienne,	75 1/4.
	Preslaw,	113 1/3.
	Liebzick	85 1/4.
	Dantzicke,	109.
	Lubecke,	82.
	Barcellone,	121.
	Lishburne,	83 1/4.
	Geanes,	132 1/2.

The agreement of the waight at Paris, with the waights *at other places.*

Paris.

100 li. waight at Paris, doe make at

London,	109 $\frac{1}{2}$.
Antwarpe,	105 $\frac{1}{4}$.
Franckeford,	96 $\frac{3}{4}$.
Collen &c.	102 $\frac{1}{4}$.
Nuremberge,	097 $\frac{7}{8}$.
Rouan,	095 $\frac{3}{8}$.
Lyons,	115 $\frac{7}{8}$.
Diepe,	98.
Geneua,	88 $\frac{1}{4}$.
Toulouse,	120. [illegible]
Rochell,	122 $\frac{1}{8}$.
Marcellis,	121 $\frac{1}{2}$.
Siuell	107 $\frac{1}{4}$.
Venice, &c.	164.
Venice, &c.	103.
Aquila,	153 $\frac{3}{4}$.
Vienne,	87 $\frac{1}{4}$.
Breslaw,	131 $\frac{1}{2}$.
Liebzig,	094 $\frac{1}{8}$.
Dantzicke,	126 $\frac{1}{4}$.
Lubecke,	95 $\frac{1}{8}$.
Barcellone,	140 $\frac{5}{8}$.
Lishburne,	96 $\frac{3}{4}$.
Geanes,	153 $\frac{3}{4}$.

The agreement of the waight at Diepe, with the waights *at other places.*

Diepe.

100 li. waight at Diepe, do make at	London	111 1/2.
	Antwarpe,	107 3/4.
	Franckeforde,	98 3/4.
	Collen, &c.	102.
	Nuremberge,	97 7/8.
	Rouan,	097 2/4.
	Lyons,	118 1/8.
	Paris,	102.
	Geneua,	90 1/8.
	Toulouse,	122 3/8.
	Rochell,	124 1/2.
	Marseilles,	123 7/8.
	Siuell,	109 3/8.
	Venice suttle, &c.	166 3/8.
	Venice grosse, &c.	105.
	Aquila,	156 1/4.
	Vienna.	089 1/8.
	Preslawe,	134 3/4.
	Liebzig,	101.
	Dantzicke,	128 3/4.
	Lubecke	097 1/8.
	Barcellone,	143 1/8.
	Lishburne,	98 3/4.
	Geanes,	156 3/4.

The agreement of the waight at Geneua, with the waights *at other places.*

Geneua.

100 li. waight at Geneua, do make at		
	London,	123 3/4.
	Antwarpe.	119 1/8.
	Franckford, &c.	109 1/2.
	Collen &c.	113 7/8.
	Nuremberge,	110 3/4.
	Rouan,	108 3/8.
	Lyons,	131 7/8.
	Paris,	113 1/8,
	Diepe,	98.
	Toulouse,	135 1/4.
	Rochell.	138 1/8.
	Marcellis,	137 1/4.
	Siuell,	121 3/8.
	Venice, &c.	184 1/2.
	Venice &c.	116 1/2.
	Aquila.	174.
	Vienne,	98 7/8.
	Preslaw.	148 7/8.
	Liebsig,	112.
	Dantzicke.	143.
	Lubecke,	107 1/2.
	Barcellone,	158 1/4.
	Lishburne,	109 1/2.
	Geanes.	174.

The agreement of the waight at Toulouse, with the waights at *other places.*

Toulouse.

100 li. waight at Toulouse, do make at

London	091 $\frac{3}{4}$.
Antwarpe,	087 $\frac{1}{2}$.
Franckeforde,	80 $\frac{5}{8}$.
Collen, &c.	083 $\frac{1}{4}$.
Nuremberge,	081 $\frac{7}{8}$.
Rouan,	079 $\frac{1}{4}$.
Lyons,	096 $\frac{1}{2}$.
Paris,	083 $\frac{1}{4}$.
Diepe,	81 $\frac{1}{2}$.
Geneua,	73 $\frac{5}{8}$.
Rochell,	101 $\frac{1}{2}$.
Marseilles,	101 $\frac{1}{8}$.
Siuell,	089 $\frac{3}{8}$.
Venice suttle, &c.	135 $\frac{7}{8}$.
Venice grosse, &c.	081 $\frac{5}{8}$.
Aquila,	128.
Vienne.	72 $\frac{3}{4}$.
Preslawe,	109 $\frac{5}{8}$.
Liebzig,	082 $\frac{3}{8}$.
Dantzicke,	105 $\frac{3}{4}$.
Lubecke	79 $\frac{1}{4}$.
Barcellona,	116 $\frac{7}{8}$.
Lishburne,	80 $\frac{5}{8}$.
Geanes,	126 $\frac{1}{4}$.

The agreement of the waight at Rochell, with the waights *at other places.*

Rochell.

100 li. waight at Rochell, do make at

London,	89 $\frac{5}{8}$.
Antwarpe.	86 $\frac{1}{8}$.
Franckford, &c.	79 $\frac{1}{4}$.
Collen &c.	81 $\frac{7}{8}$.
Nuremberge,	80 $\frac{1}{8}$.
Rouan,	78 $\frac{1}{4}$.
Lyons,	94 $\frac{7}{8}$.
Paris,	81 $\frac{7}{8}$.
Diepe,	80 $\frac{1}{4}$.
Geneua,	72 $\frac{1}{4}$.
Toulouse,	98 $\frac{1}{4}$.
Marcellis,	99 $\frac{1}{2}$.
Siuell,	87 $\frac{3}{8}$.
Venice, &c.	133 $\frac{5}{8}$.
Venice, &c.	84 $\frac{1}{8}$.
Aquila,	125 $\frac{7}{8}$.
Vienne,	71 $\frac{1}{2}$.
Preslaw,	107 $\frac{3}{4}$.
Liebsig,	81 $\frac{5}{8}$.
Dantzicke.	103 $\frac{1}{2}$.
Lubecke,	77 $\frac{7}{8}$.
Barcellona,	114 $\frac{7}{8}$.
Lishburne,	79 $\frac{1}{4}$.
Geanes.	125 $\frac{3}{8}$.

The agreemẽt of the waight at Marcellis, with the waightes *at other places.*

100 li. waight at Marcellis doe make at

	Marcellis.
London.	88 1/2.
Antwarpe,	86 1/2.
Franckford,	79 5/8.
Collen, &c.	82 3/4.
Nuremberge,	80 3/8.
Rouan,	78 7/8.
Lions,	95 1/4.
Paris,	82 1/4.
Diepe,	80 5/8.
Geneua,	72 1/2.
Toulouse,	98 3/4.
Rochell,	100 1/2.
Siuell,	88 1/2.
Venice, &c.	134 3/4.
Venice, &c.	84 3/4.
Aquila,	126 1/2.
Vienne,	71 7/8.
Preslaw,	108 1/4.
Liebsig,	81 3/8.
Dantzicke,	104.
Lubecke,	78 1/8.
Barcellone,	115.
Lisbborne,	79 5/8.
Geanes.	126. 1/8.

The agreement of the waight at Siuell, with the waights *at other places.*

Siuell.

100 li. waight at Siuel, doe make at

London,	102.
Antwarpe.	098 $\frac{1}{2}$.
Franckeford,	79 $\frac{5}{8}$.
Collen, &c.	093 $\frac{1}{8}$.
Nuremberge,	91 $\frac{1}{8}$.
Rouan,	089 $\frac{1}{4}$.
Lyons,	107 $\frac{7}{8}$.
Paris,	093 $\frac{1}{8}$.
Diepe,	091 $\frac{1}{4}$.
Geneua,	82 $\frac{1}{4}$.
Toulouse,	111 $\frac{3}{4}$.
Rochell,	113 $\frac{2}{4}$.
Marseilles,	113 $\frac{1}{4}$.
Venice, &c,	152.
Venice, &c.	096.
Aquila,	143 $\frac{1}{4}$.
Vienne.	081 $\frac{3}{8}$.
Breslaw,	122 $\frac{5}{8}$.
Liebzig,	092 $\frac{1}{4}$.
Dantzicke,	117 $\frac{2}{4}$.
Lubecke,	088 $\frac{5}{8}$.
Barcellone,	130 $\frac{3}{4}$.
Lishborne, &c.	90 $\frac{1}{8}$.
Geanes,	143 $\frac{1}{4}$.

The agreement of the waight Suttle at venice, with the waightes *at other places.*

Venice suttle waight.

100 li. waight suttle at Venice, doe make at

London.	067.
Antwarpe,	064 $\frac{1}{7}$.
Franckford,	59 $\frac{1}{4}$.
Collen, &c.	61 $\frac{1}{4}$.
Nuremberge,	60.
Rouan,	58 $\frac{5}{8}$.
Lions,	71.
Paris,	61 $\frac{1}{4}$.
Diepe,	60.
Geneua,	54 $\frac{1}{8}$.
Toulouse,	73 $\frac{1}{2}$.
Rochell,	74 $\frac{3}{4}$.
Marcellis,	74 $\frac{3}{8}$.
Siuell,	65 $\frac{3}{4}$.
Venice, &c.	63 $\frac{1}{8}$.
Aquila,	94 $\frac{1}{8}$.
Vienne,	53 $\frac{1}{2}$.
Preslaw,	80 $\frac{3}{4}$.
Liebsig,	60 $\frac{5}{8}$.
Dantzicke,	77 $\frac{3}{8}$.
Lubecke,	58 $\frac{1}{4}$.
Barcellone,	86.
Lishborne,	59 $\frac{1}{4}$.
Geanes.	94. $\frac{1}{8}$.

The agreement of the grosse waight at Venice, with the waights *at other places.*

Venice grosse waight.

100 li. grosse waight at venice doe make at

London,	106 1/4.
Antwarpe.	102 1/8.
Franckeford,	93 7/8.
Collen & Ausberg	97.
Nuremberge,	95.
Rouan,	93.
Lyons,	112 3/8.
Paris,	97.
Diepe,	95 3/8.
Geneua,	85 3/4.
Toulouse,	116 3/8.
Rochell,	118 1/2.
Marseilles,	117 7/8.
Siuell,	104 2/8.
Venice, sut. &c.	158 1/4.
Aquila.	149 1/8.
Vienne.	84 3/4.
Preslaw,	127 3/4.
Liebzig,	96.
Dantzicke,	122 5/8.
Lubecke,	92 3/8.
Barcellone,	136 1/8.
Lishborne, &c.	93 7/8.
Geanes,	149 1/8.

The agreement of the waights at Aquila, with the waights *at other places.*

Aquila.

100 li. waight at Aquila doe make at

London,	71 $\frac{1}{4}$.
Andwarpe,	68 $\frac{3}{8}$.
Franckforde,	62 $\frac{7}{8}$.
Collen &c.	65.
Nuremberge,	63 $\frac{5}{8}$.
Rouan,	62 $\frac{1}{4}$.
Lyons,	75 $\frac{3}{4}$.
Paris,	65.
Diepe,	63 $\frac{5}{8}$.
Geneua,	57 $\frac{3}{8}$.
Toulouse,	78.
Rochell,	79 $\frac{3}{8}$.
Marsellis,	79.
Seuill,	69 $\frac{3}{4}$.
Venice sut: wai.	106.
Venice gros. wa:	67.
Vienne,	56 $\frac{3}{4}$.
Preslawe,	85 $\frac{3}{4}$.
Liebzig,	64 $\frac{3}{4}$.
Dantzicke,	82 $\frac{1}{8}$.
Lubeck,	61 $\frac{7}{8}$.
Barcellone	91 $\frac{3}{4}$.
Lishburne,	62 $\frac{7}{8}$.
Geanes,	100.

The agreement of the waight at Vienne, with the waights *at other places.*

Vienne.

100 li. waight at viēne, do make at

London,	125 $\frac{1}{4}$.
Antwarpe,	120 $\frac{1}{4}$.
Franckeford,	110 $\frac{3}{4}$.
Collen, &c,	114 $\frac{3}{8}$.
Nuremberge,	112.
Rouan,	109 $\frac{5}{8}$.
Lyons,	132 $\frac{1}{2}$.
Paris,	114 $\frac{3}{8}$.
Diepe,	112 $\frac{1}{8}$.
Geneua,	101 $\frac{1}{8}$.
Toulouse,	237 $\frac{3}{4}$.
Rochell,	139 $\frac{5}{8}$.
Marseilles	139.
Siuell,	122 $\frac{1}{4}$.
Venice, &c.	186 $\frac{5}{8}$.
Venice, &c.	117 $\frac{7}{8}$.
Aquila,	175 $\frac{7}{8}$.
Preslaw,	150 $\frac{5}{8}$.
Liebzig,	113 $\frac{1}{4}$.
Danzig,	144 $\frac{1}{2}$.
Lubecke,	108 $\frac{7}{8}$.
Barcellone,	160 $\frac{1}{2}$.
Lishburne,	110 $\frac{3}{4}$.
Geanes.	175 $\frac{7}{8}$.

The agreement of the waights at Preslawe, with the waights *at other places.*

Preslawe.

100 li. waight at Preslawe, doe make at

London,	83 1/8.
Andwarpe,	79 7/8.
Franckforde,	73 1/2.
Collen &c.	75 7/8.
Nurembergh,	74 1/4.
Rouan,	72 3/4.
Lyons,	88.
Paris,	75 7/8.
Diepe,	74 3/8.
Geneua,	67 1/8.
Toulouse,	91 1/8.
Rochell,	92 3/4.
Marsellis,	92 1/4.
Seuill	81 1/2.
Venice sut: wai.	123 7/8.
Venice gros. wa:	78 1/4.
Aquila	116 3/4.
Vienne,	66 3/8.
Liebzig,	75 1/8.
Dantzicke,	96 3/8.
Lubeck,	72 1/4.
Barcellone	106 1/2.
Lishburne,	73 1/2.
Geanes,	116 3/4.

The agreemẽt of the waight at Liebzig, with the waights *at other places.*

Liebzig.

100 li. waight at Liebzig, doe make at

London,	110 $\frac{1}{2}$.
Antwarpe,	106 $\frac{1}{4}$.
Franckeford,	97 $\frac{3}{4}$.
Collen, &c,	100 $\frac{7}{8}$.
Nuremberge,	98 $\frac{7}{8}$.
Rouan,	96 $\frac{3}{4}$.
Lyons,	117.
Paris,	100 $\frac{7}{8}$.
Diepe,	99.
Geneua,	89 $\frac{1}{4}$.
Toulouse,	121 $\frac{1}{8}$.
Rochell,	123 $\frac{1}{4}$.
Marseilles	122 $\frac{5}{8}$.
Siuell,	108 $\frac{3}{4}$.
Venice, &c.	164 $\frac{3}{4}$.
Venice, &c.	104.
Aquila,	155 $\frac{1}{4}$.
Vienne,	88 $\frac{1}{4}$.
Breslaw,	132 $\frac{7}{8}$.
Danzig,	127 $\frac{5}{8}$.
Lubecke,	96 $\frac{1}{8}$.
Barcellone,	141 $\frac{5}{8}$.
Lishburne,	97 $\frac{3}{4}$.
Geanes.	155 $\frac{1}{4}$.

The agreement of the waight at Dansicke, with the waights *at other places.*

Dantsicke.

100 li. waight at Danzicke, doe make at

London,	86 $\frac{5}{8}$.
Andwarpe,	83 $\frac{1}{4}$.
Franckforde,	76 $\frac{1}{4}$.
Collen, &c.	79.
Nuremberge,	77 $\frac{1}{2}$.
Rouan,	75 $\frac{1}{4}$.
Lyons,	91 $\frac{5}{8}$.
Paris,	79.
Diepe,	77 $\frac{1}{2}$.
Geneua,	69 $\frac{7}{8}$.
Toulouse,	94 $\frac{7}{8}$.
Rochell,	96 $\frac{1}{2}$.
Marsellis,	96 $\frac{5}{8}$.
Syuill	84 $\frac{7}{8}$.
Venice sut: wai.	129.
Venice gros. wa:	81 $\frac{1}{2}$.
Aquila	121 $\frac{5}{8}$.
Vienne,	69 $\frac{1}{2}$.
Preslawe,	104 $\frac{1}{8}$.
Liebzig,	78 $\frac{1}{4}$.
Lubeck,	75 $\frac{1}{8}$.
Barcellone	111.
Lishburne,	76 $\frac{1}{2}$.
Geanes,	121 $\frac{5}{8}$.

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The agreement of the waight at Lubecke, with the waights at other places.

at other places.

100 li. waight at Lubecke, do make at

	Lubecke.
London,	115.
Antwarpe	110 $\frac{1}{2}$.
Franckkford,	101 $\frac{5}{8}$.
Collen, &c.	105.
Nuremberge	102 $\frac{3}{4}$.
Rouan,	100 $\frac{5}{8}$.
Lyons,	121 $\frac{5}{8}$.
Paris,	105.
Diepe,	102 $\frac{7}{8}$.
Geneua,	92 $\frac{3}{4}$.
Toulouse,	126.
Rochell,	128 $\frac{1}{4}$.
Marcellis.	127 $\frac{1}{2}$.
Siuell,	114 $\frac{5}{8}$.
Venice, &c.	171 $\frac{1}{4}$.
Venice, &c.	108 $\frac{1}{8}$.
Aquila,	161 $\frac{1}{2}$.
Vienne,	91 $\frac{3}{4}$.
Preslaw,	138 $\frac{1}{4}$.
Liebzig,	103 $\frac{7}{8}$.
Dantzicke.	132 $\frac{5}{8}$.
Barcellone.	147 $\frac{1}{4}$.
Lishborne	101 $\frac{5}{8}$.
Geanes.	161 $\frac{1}{2}$.

The agreement of the waight at Barcellone, with the waights at other places.

		Barcellone.
100 li. waight at Barcellone, do make at	London,	78.
	Andwarpe,	75.
	Franckford,	$68\frac{5}{8}$.
	Collen, &c.	$71\frac{1}{4}$.
	Nuremberge,	$69\frac{3}{4}$.
	Rouane,	$68\frac{1}{4}$.
	Lyons,	$82\frac{1}{2}$.
	Paris,	$71\frac{1}{4}$.
	Diepe,	$69\frac{3}{4}$.
	Geneua,	$62\frac{7}{8}$.
	Toulouse,	$85\frac{1}{2}$.
	Rochell	87.
	Marcellis,	$86\frac{1}{2}$.
	Siuell,	$76\frac{3}{8}$.
	Venice suttle,	$116\frac{1}{4}$.
	Venice grosse,	$73\frac{5}{8}$.
	Aquila,	$109\frac{1}{2}$.
	Vienne,	$62\frac{7}{8}$.
	Breslawe,	$93\frac{3}{4}$.
	Liebzig,	$70\frac{1}{2}$
	Dantzicke,	90.
	Lubecke,	$67\frac{3}{4}$.
	Lishborne,	$68\frac{5}{8}$.
	Geanes,	$109\frac{1}{2}$.

The agreement of the waight at Lishburne, with the waights *at other places.*

Lishburne.

100 li. waight at Lishburn do make at

London,	113 1/8.
Antwarpe.	108 3/4.
Franckford,	100.
Collen &c.	103 1/4.
Nuremberge,	102 1/8.
Rouan,	99.
Lyons,	119 5/8.
Paris,	103 1/4.
Diepe,	101 1/4.
Geneua,	091 1/4.
Toulouse,	124.
Rochell,	126 1/8.
Marcellis,	125 1/2.
Siuell,	110 3/4.
Venice, &c.	168 1/2.
Venice, &c.	106 3/8.
Aquila,	158 3/4.
Vienne,	090 1/4.
Preslaw,	135 7/8.
Liebsig,	102 1/4.
Dantzicke.	130 1/2.
Lubecke,	098 1/4.
Barcellone,	144 7/8.
Geanes.	158 1/4.

The agreement of the waight at Geanes, with the waights *at other places*.

Geanes.

100 li. waight at geans, doe make at

London.	71 $\frac{1}{4}$.
Antwarpe,	68 $\frac{3}{8}$.
Franckford,	62 $\frac{7}{8}$.
Collen, &c.	65.
Nuremberge,	63 $\frac{5}{8}$.
Rouan,	62 $\frac{1}{4}$.
Lions,	75 $\frac{1}{4}$.
Paris,	65.
Diepe,	63 $\frac{1}{8}$.
Geneua,	57 $\frac{3}{8}$.
Toulouse,	78.
Rochell,	79 $\frac{3}{8}$.
Marcellis,	79.
Siuell,	69 $\frac{3}{4}$.
Venice, &c.	106.
Venice, &c.	67.
Aquila,	100.
Vienne,	56 $\frac{3}{4}$.
Preslaw,	85 $\frac{3}{4}$.
Liebsig,	64 $\frac{1}{4}$.
Dantzicke,	82 $\frac{1}{8}$.
Lubecke,	61 $\frac{7}{8}$.
Barcellone,	91 $\frac{1}{4}$.
Lishborne,	62 $\frac{7}{8}$.

Heere followeth the Table of all that is contayned in this *Booke*.

The Third part of this Booke treateth of all maner *of neceſſarie Queſtions which are vſed in the trade of Marchandize.*

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FINIS.


LVCRECIA·ROMANA